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Long-term magnetic activity in close binary systems.[⋆]
I. Patterns of color variations[⋆⋆⋆⋆⋆]

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ABSTRACT

Aims. This is the first of a series of papers in which we present the results of a long-term photometric monitoring project carried out at Catania Astrophysical Observatory and aimed at studying magnetic activity in late-type components of close binary systems, its dependence on global stellar parameters, and its evolution on different time scales from days to years. In this first paper, we present the complete observations dataset and new results of an investigation on the origin of brightness and color variations observed in the following well-known magnetically active close binary stars: AR Psc, VY Ari, UX Ari, V711 Tau, EI Eri, V1149 Ori, DH Leo, HU Vir, RS CVn, V775 Her, AR Lac, SZ Psc, II Peg and BY Dra

Methods. About 38,000 high-precision photoelectric nightly observations in the U, B and V filters are analysed. Correlation and regression analyses of the V magnitude vs. U−B and B−V color variations are carried out and a comparison with model variations for a grid of active regions temperature and filling factor values is also performed.

Results. We find the existence of two different patterns of color variations. Eight stars in our sample: BY Dra, VY Ari, V775 Her, II Peg, V1149 Ori, HU Vir, EI Eri and DH Leo become redder when they get fainter, as it is expected from the presence of active regions consisting of cool spots. The other six stars show the opposite behaviour, i.e. they become bluer when they get fainter. For V711 Tau this behaviour could be explained by the increased relative U- and B- flux contribution by the earlier-type component of the binary system when the cooler component gets fainter. On the other hand, for AR Psc, UX Ari, RS CVn, SZ Psc and AR Lac the existence of hot photospheric faculae must be necessarily invoked. We also found that in single-lined and double-lined binary stars in which the fainter component is inactive or much less active the V magnitude is correlated to B−V and U−B color variations in more than 60% of observation seasons. The correlation is found in less than 40% of observation seasons when the fainter component has a non-negligible level of activity and/or hot faculae are present but they are either spatially or temporally uncorrelated to spots.

Key words. Stars: activity - Stars: close binaries - Stars: late-type - Stars: magnetic fields - Stars: fundamental parameters - Methods: observational - Techniques: photometric

1. Introduction

Studies of stellar magnetic activity and variability at Catania Astrophysical Observatory (OAC) date back to the late Sixties, when a pioneering research was undertaken to explore the nature of stellar spots (Rodonò 1965) and stellar flares (Cristaldi & Rodonò 1968; Cristaldi, Narbone & Rodonò 1968).

The existence of stellar spots, first proposed by Kron (1950) as cause of the variability observed in a few late-type stars, was still debated at that time. The research at OAC significantly contributed to understand their nature and yielded relevant results such as the discovery of the characteristic outside-of-eclipse *photometric* or *distortion wave* on the light curve of the proto-type RS CVn system (Chisari & Lacona 1965; Catalano & Rodonò 1967) playing an important role in the identification of the new class of binaries named after *RS CVn* (Oliver 1974; Hall 1976). Also stellar flare studies at OAC, contemporary carried out within the coordination of the *Working Group on Flare Stars* (Gershberg & Shakhovskaya 2003), yielded relevant progresses and had dedicated the 71st IAU Colloquium on *Activity in Red Dwarf Stars* (Byrne & Rodonò 1983).

Research on stellar spots, during the course of many years, has progressively revealed that spots are non-stationary phenomena that after a few stellar rotations undergo, depending on the value of global stellar properties, sizeable changes in their dimension, number and surface distribution. Furthermore, if the star rotates differentially, spots at different latitudes produce different variability terms in the frequency domain and any initial spot distribution is significantly sheared after some rotations (Lanza et al. 1993; 1994). Since light curves undergo noticeable changes, active stars must be monitored as continuously as possible if we want to derive significant information on the behaviour of stellar activity. For this reason,

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[⋆] I dedicate this paper to the memory of the P.I. of this project, Prof. Marcello Rodonò, who suddenly passed away on October 23, 2005. To him my sincere estimation and deepest gratitude.

[⋆⋆] Based on observations collected at INAF-Catania Astrophysical Observatory, Italy.

[⋆⋆⋆] Tables 4-7 are available only in electronic form.

Table 1 Program stars: spectral type; rotation period; brightest V magnitude (V_{min}), maximum light curve amplitude (ΔV_{max}), mean colors, and total flux ratios (L_c/L_h) in the V, B and U bands of the cool (c) to the hot (h) components

Program Star	HD Number	Name	Sp. Type	Period (d)	V_{min} (mag)	ΔV_{max} (mag)	$< B-V >$ (mag)	$< U-B >$ (mag)	L_c/L_h V	B	U
1	8357	AR Psc	K1 IV/V + G5/6 V	12.38	7.243	0.186	0.836	0.383	5.6	4.8	3.5
2	17433	VY Ari	K3/4 IV + ?	16.3	6.690	0.421	0.979	0.649	—	—	—
3	21242	UX Ari	K0 IV + G5 V	6.43971	6.362	0.273	0.852	0.438	11.2	9.5	6.9
4	22468	V711 Tau	K1 IV + G5 V	2.83774	5.635	0.171	0.901	0.474	4.5	3.4	1.5
5	26337	EI Eri	G5 IV + G0 V	1.94722	6.921	0.159	0.662	0.105	2.6	2.4	2.1
6	37824	V1149 Ori	K2/3 III + F8 V	53.12	6.593	0.277	1.155	0.963	14.8	8.1	2.5
7	86590	DH Leo	K0 V + K7 V	1.070354	7.811	0.079	0.898	0.481	6.5[a]	8.9[a]	20.8[a]
8	106225	HU Vir	K1 IV + ?	10.41	8.549	0.419	1.023	0.647	—	—	—
9	114519	RS CVn	K0 IV + F5 V	4.797855	7.858	0.203	0.621	0.103	0.9	0.5	0.3
10	175742	V775 Her	K0 V + K5/M2 V	2.879342	7.800	0.185	0.904	0.609	15.8[a]	22.2[a]	53.0[a]
11	210334	AR Lac	K2 IV + G2 IV	1.98322195	6.030	0.160	0.768	0.725	1.4	1.2	0.9
12	219113	SZ Psc	K1 IV + F8 V/IV	3.9657889	7.155	0.115	0.846	0.365	3.8	2.8	1.7
13	224085	II Peg	K2 IV + ?	6.720	7.283	0.671	1.031	0.761	—	—	—
14	234677	BY Dra	M0 V + M0 V	3.836	8.003	0.176	1.172	1.043	1.0	1.0	1.0

[a] total flux ratio of the hot to the cool component

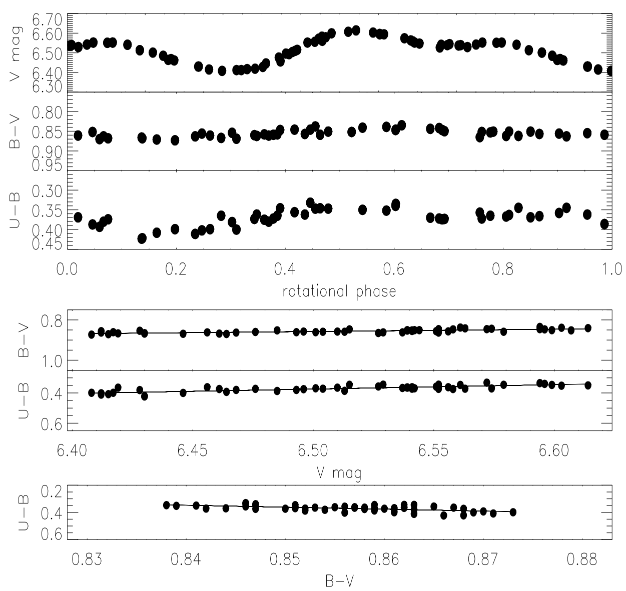

Fig. 1 *Upper panels:* V magnitude, B−V and U−B colors of UX Ari vs. rotational phase for the mean epoch 1993.82. *Lower panels:* Color-magnitude (B−V and U−B vs. V) and color-color (U−B vs. B−V) variations along with a linear fit (solid line).

the photometric monitoring at OAC became more and more systematic and was extended during the last three decades to a much larger sample of stars, either single or in close binary systems with a wide range of values of global properties (see, e.g., the series of papers by Cutispoto 1990; 1991; 1992; 1993; 1995). The photometric patrol, initially carried out with the 30-cm and 91-cm telescopes of OAC, was afterwards continued mainly with the use of two APTs, i.e. automatic photometric telescopes: the *Phoenix-25* since 1988 (Rodonò & Cutispoto 1992) and the Catania *APT80/1*, entirely dedicated to this project since 1992 (Rodonò et al. 2001b; Messina, Rodonò & Cutispoto 2004). Indeed, very high duty cycle and fully automation have revealed the APTs to be best suited to obtain a homogeneous and systematic data base of high-quality multiband photometry of magnetically active stars (Rodonò 1992; Rodonò & Cutispoto 1994a; 1994b).

Starting from the Eighties, other institutions begun similar long-term photometric monitoring projects with the use of robotic telescopes. Among the most relevant projects, we just mention the *Sun in Time* undertaken by the Villanova University (see, e.g., Messina & Guinan 2002; 2003). All these projects have made feasible a direct comparison between theoretical predictions and observational results, contributing significantly to increase our knowledge on starspot properties, active region growth and decay (ARGD), activity cycles, surface differential rotation, active longitudes and flip-flop phenomena, orbital period variations and their dependence on stellar parameters.

In a series of papers we will present the final results on active close binary systems obtained by the long-term photometric monitoring project of OAC. For instance, the results of a similar project, but on single main-sequence stars, was presented in a previous series of papers (Messina & Guinan 2002; 2003). In this first paper we investigate the origin of different patterns of color variations shown by active close binary systems. Starspots cycles and surface differential rotation will be the main subjects of following papers.

The stellar sample and the photometric database are presented in Sect. 2. and 3. In Sect. 4 we investigate the correlation between color and magnitude variations on both short and long timescales. In Sect. 5 we describe a simple modelling approach to probe the nature of color variations. Discussion and conclusions are given in Sect. 6 and 7, respectively.

2. The stellar sample

From the whole stellar sample of about fifty stars monitored at OAC (see Rodonò et al. 2001b), we selected for the present analysis those stars for which we obtained the most extended data time series. The stellar sample analysed in this paper consists of 14 binary systems: six are SB1-type systems; eight are SB2-type systems, three of which are detached eclipsing binaries (see Table 1). In this Section we

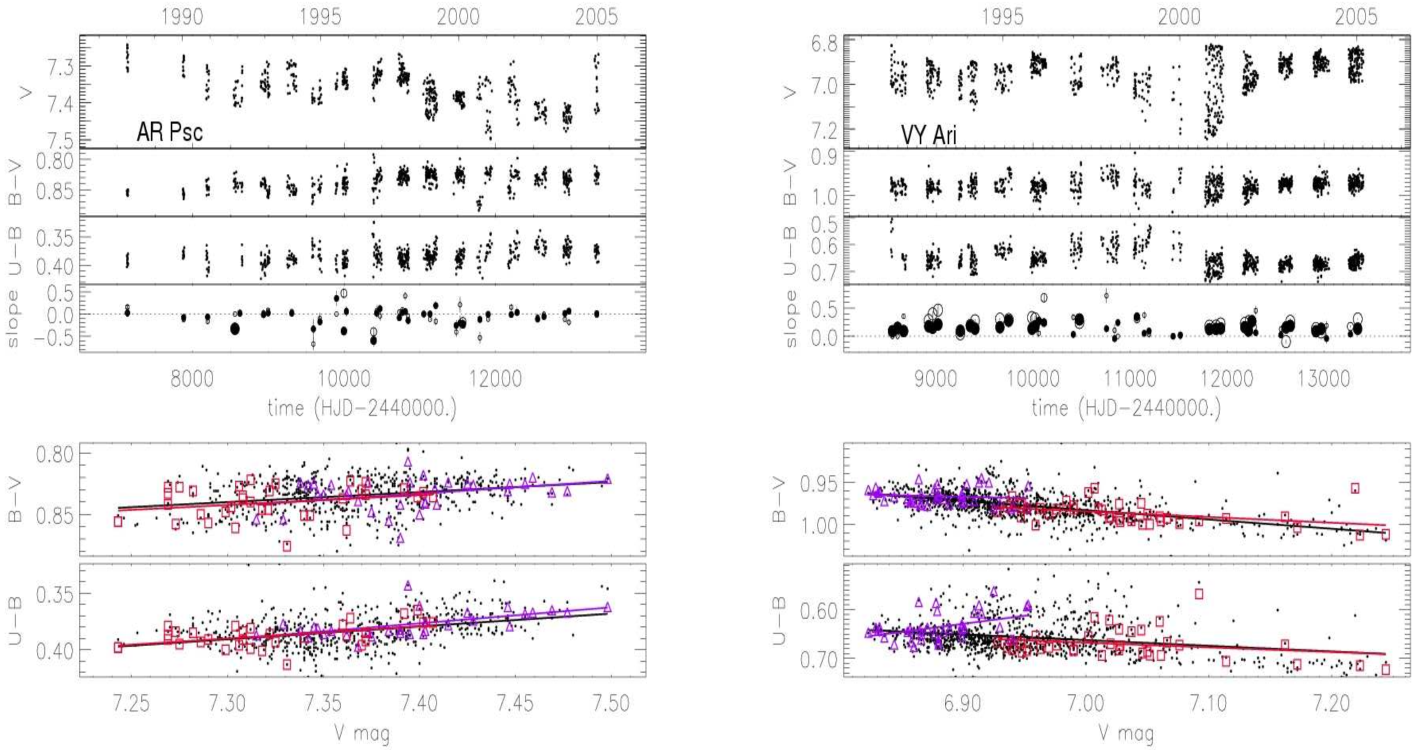

Fig. 2 *Left plot:* From top to bottom V-band magnitudes, B−V and U−B colors, and slopes of the linear fit to the B−V vs. V (filled circles) and U−B vs. V (open circles) relations vs. time for AR Psc. Larger symbol size indicates a larger significance level. Bottom panels: B−V and U−B colors vs. V magnitudes (dots). Triangles and squares show the relation between bluest and brightest and between reddest and faintest light curve values, respectively. Solid lines are linear fits to the mentioned relations. *Right plot:* the same as in the left plot, but for VY Ari.

give some information from the literature on their optical behaviour and the values of their physical parameters that will be used in the following to model the color variations. In the following we indicate as primary of the binary system the more massive and luminous component, not of earlier spectral type.

AR Psc (HD 8357) is an SB2 RS CVn-type variable consisting of a primary K1 subgiant and a secondary G5/6 dwarf (Cutispoto 1998). This system has an orbital period of $P_{\rm orb} = 14.3023^d$ (Fekel 1996), which is not synchronized with the rotational photometric period of $P_{\rm pho} = 12.38^d$ (Cutispoto, Messina & Rodonò 2001). The observed photometric variability is likely dominated by the more active and luminous subgiant component. However, the anticorrelation between U−B and V data found by Cutispoto (1995) may arise from the earlier-type component, as it will be discussed. We adopt for the hot (h) and cool (c) components the following values from Strassmeier et al. (1993), Hongguam et al. (2006), and Cox (2000): $T_h = 5600$ K, $T_c = 4880$ K, $R_h = 0.92\ R_\odot$, $R_c = 2.7\ R_\odot$, $\log g_h = 4.5$, $\log g_c = 3.0$ cm s^{-2}, $M_h/M_c = 0.82$, $i = 37°$. By using Eqs. (1) and (6) from Morris & Naftilan (1993, and references therein), we computed that the variability of AR Psc arising from proximity and reflection effects is about $\Delta V_{\rm ellip} = 6.0 \cdot 10^{-4}$ mag and $\Delta V_{\rm ref} = 1.3 \cdot 10^{-4}$ mag.

VY Ari (HD 17433) is an SB1 RS CVn-type variable with a primary K3/4 subgiant. This system has an orbital period of $P_{\rm orb} = 16.42^d$ (Strassmeier & Bopp 1992), and a variable rotational photometric period of about $P_{\rm pho} \sim 16.3^d$ (Messina, Rodonò & Cutispoto 2004; Frasca et al. 2005). On the basis of the Li 6707.8 Å abundance, a significant infrared excess and the non-synchronized orbital/rotational period, Bopp et al. (1989) suggest that this star could be a PMS system. We adopt the effective temperature from Frasca et al. (2005) and the surface gravity proper for its spectral class (Cox 2000): $T_h = 4900$ K, $\log g_h = 4.0$ cm s^{-2}. VY Ari will be treated in the analysis as a single star and proximity and reflection effects will be considered negligible.

UX Ari (HD 21242) is a triple system consisting of a SB2 RS CVn-type binary having a primary K0 subgiant and a secondary G5 dwarf (Cutispoto, Messina & Rodonò 2001), and of a third faint late-type star (Duemmler & Aarum 2001). This system has a rotational photometric period similar to the orbital period of $P_{\rm orb} = 6.43791^d$ (Carlos & Popper 1971). UX Ari is known to have B−V and U−B color variations anticorrelated with the V-band flux variation, i.e. when the star becomes fainter it gets bluer (Zeilik et al. 1982; Rodonò & Cutispoto 1992). A flux contribution by the earlier-type component has been suspected as the cause of the color blueing (Wacker et al. 1986; Mohin & Raveendran 1989). We adopt for the system's components the values of parameters from Aarum Ulvas & Engvold (2003) and Strassmeier et al. (1993): $T_h = 5620$ K, $T_c = 4750$ K, $T_3 = 4400$ K, $R_h = 1.11\ R_\odot$, $R_c = 5.78\ R_\odot$, $R_3 = 0.70\ R_\odot$, $M_h/M_c = 0.80$, $i = 60°$, and the surface gravity proper for their spectral classes: $\log g_h = 4.5$, $\log g_c = 3.5$, $\log g_3 = 4.5$ cm s^{-2}. The flux from the third component has been properly scaled to take into account the parallax difference with respect to the K0 IV + G5 V bi-

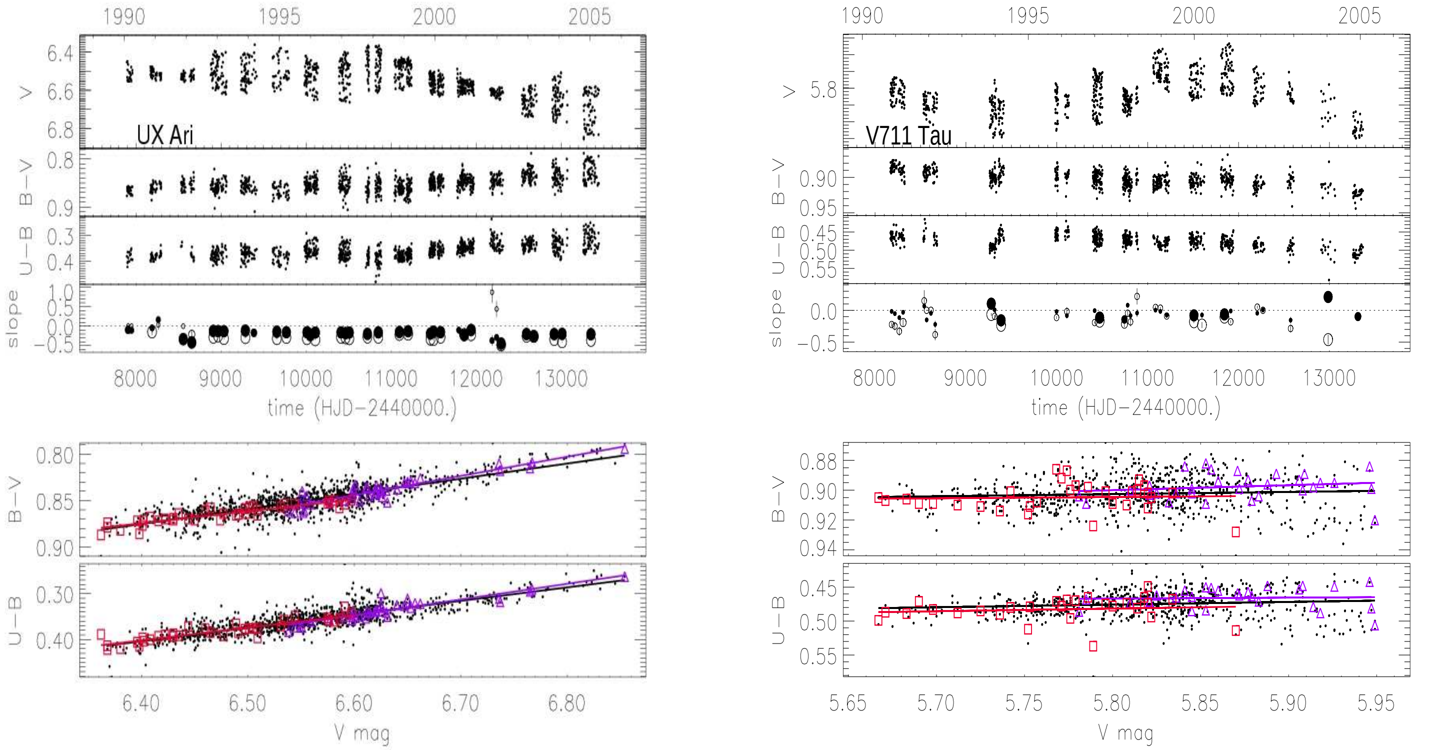

Fig. 3 As in Fig. 2, but for UX Ari and V711 Tau.

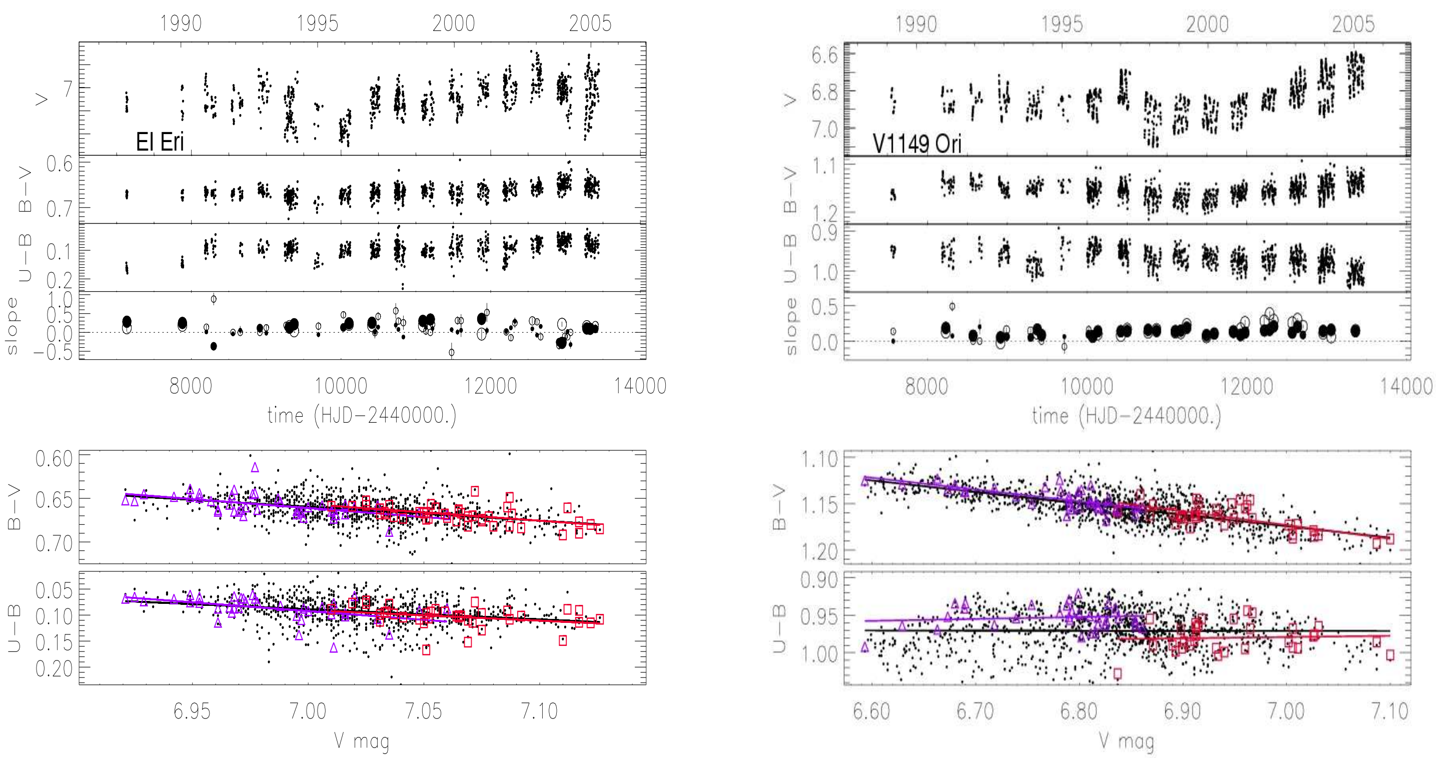

Fig. 4 As in Fig. 2, but for EI Eri and V1149 Ori.

nary. We find that the variability of UX Ari arising from proximity and reflection effects is about $\Delta V_{ellip} = 8.7 \cdot 10^{-3}$ mag and $\Delta V_{ref} = 4.3 \cdot 10^{-3}$ mag (Morris & Naftilan 1993).

V711 Tau (HD 22468) is an SB2 RS CVn-type variable consisting of a primary K1 subgiant and a secondary G5 dwarf (Fekel 1983). The RS CVn-type binary belongs to a visual binary, ADS 2644B (K3V) being its secondary component. The system has an orbital period of $P_{orb} = 2.83774^d$ (Fekel 1983) which does not differ significantly from the photometric rotational period (Lanza et al. 2006). Although the observed photometric variability is dominated by the more active and luminous subgiant component, a

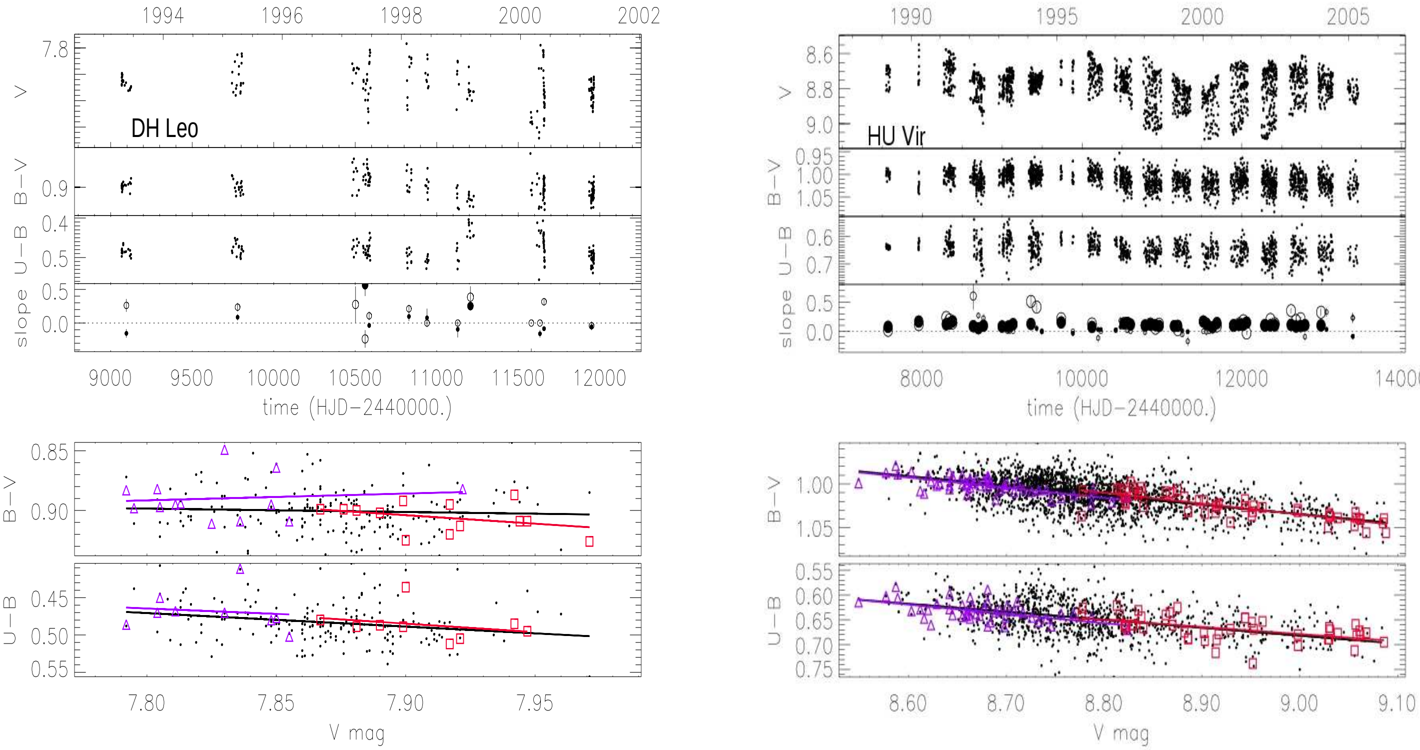

Fig. 5 As in Fig. 2, but for DH Leo and HU Vir.

flux contribution to the B and U bands by the earlier-type component has been suspected to be the cause of the color blueing (Aarum Ulvas & Henry 2005). We adopt the parameter values for the hot and cool components from Lanza et al. (2006) and for the third component from Aarum Ulvas & Engvold (2003): $T_h = 5500$ K, $T_c = 4750$ K, $T_3 = 4950$ K, $R_h = 1.1\ R_\odot$, $R_c = 3.7\ R_\odot$, $R_3 = 0.70\ R_\odot$, $M_h/M_c = 0.80$, $i = 38°$, and $\log g_h = 4.26$, $\log g_c = 3.3$, $\log g_3 = 4.5$ cm s^{-2}. We find that the variability of V711 Tau arising from proximity and reflection effects is about $\Delta V_{\rm ellip} = 0.040$ mag and $\Delta V_{\rm ref} = 3.3 \cdot 10^{-3}$ mag (Morris & Naftilan 1993). For this stars Henry et al. (1995) established that the proximity effect gives a much smaller contribution of about $\Delta V_{\rm ellip} = 0.017$.

EI Eri (HD 26337) is an SB1 RS CVn-type variable with a primary G5 subgiant and colors from UBVRI photometry consistent with a G5 IV + G0 V binary system (Cutispoto 1995). EI Eri has an orbital period of $P_{\rm orb} = 1.94722^d$ (Fekel et al. 1987) and a variable rotational photometric period of about $P_{\rm pho} = 1.94^d$ (Strassmeier et al. 1997). If granted the spectral classification by Cutispoto (1995), the observed photometric variability may partly originate from the less-active main-sequence component, as will be discussed in the following. Evidence for an anticorrelation between U−B and V data were found by Rodonò & Cutispoto (1992). We adopt for the hot and cool components the values of parameters proper for their spectral classes: $T_h = 5900$ K, $T_c = 5600$ K, $R_h = 1.1\ R_\odot$, $R_c = 2.0\ R_\odot$, $M_h/M_c \simeq 1.0$, $i = 50°$ (Strassmeier et al. 1993), and $\log g_h = 4.5$, $\log g_c = 3.5$ cm s^{-2} (Cox 2000). We find that the variability of EI Eri arising from proximity and reflection effects is about $\Delta V_{\rm ellip} = 4.0 \cdot 10^{-3}$ag and $\Delta V_{\rm ref} = 4.3 \cdot 10^{-3}$ mag (Morris & Naftilan 1993).

V1149 Ori (HD 37824) is an SB1 RS CVn-type variable with a primary K0 giant (Fekel & Henry 2005) and colors from UBVRI photometry consistent with a K2/3 III + F8 V binary system (Cutispoto, Messina & Rodonò 2001). V1149 Ori has an orbital period of $P_{\rm orb} = 53.57465^d$ (Fekel et al. 1987) and a variable rotational photometric period with a mean value of $P_{\rm pho} = 53.12^d$ (Fekel & Henry 2005). If granted the spectral classification by Cutispoto (1995), the observed photometric variability can be completely attributed to the giant component. The non-active earlier-type component can give a significant flux contribution to the U band where the total fluxes from both components tend to be comparable, as far as the magnetic activity makes the late-type component fainter. We adopt for the hot and cool components the values of parameters proper for their spectral classes: $T_h = 6200$ K, $T_c = 4600$ K, $R_h = 1.15\ R_\odot$, $R_c = 12.6\ R_\odot$, $M_h/M_c \simeq 0.90$, and $\log g_h = 4.5$, $\log g_c = 2.0$ cm s^{-2} (Cox 2000) and an assumed value of $i = 60°$. We find that the variability of V1149 Ori arising from proximity and reflection effects is about $\Delta V_{\rm ellip} = 1.3 \cdot 10^{-3}$ mag and $\Delta V_{\rm ref} = 6.3 \cdot 10^{-4}$ mag (Morris & Naftilan 1993).

DH Leo (HD 86590) is a triple system consisting of a BY-Dra type K0 V + K7 V binary with an orbital period of $P_{\rm orb} \sim 1.070354^d$ (Bolton et al. 1981) and a K5 V tertiary component (Barden 1984). The observed photometric variability is dominated by the K0 V component, whose U, B and V total fluxes are larger than the fluxes from the K5 V and K7 V. We adopt for the components the values of parameters proper for their spectral classes: $T_h = 5300$ K, $T_c = 4300$ K, $T_3 = 4600$ K, $R_h = 0.81\ R_\odot$, $R_c = 0.65\ R_\odot$, $R_3 = 0.68\ R_\odot$, $M_{\rm K0V}/M_{K7V} \simeq 1.3$, $i = 80°$ (Strassmeier et al. 1993), $\log g_h = 4.5$, $\log g_c = 4.5$, $\log g_3 = 4.5$ cm s^{-2} (Cox 2000). We find that the variability of DH Leo arising from proximity and reflection effects is about $\Delta V_{\rm ellip} = 1.0 \cdot 10^{-3}$

mag and $\Delta V_{ref} = 2.8 \cdot 10^{-3}$ mag (Morris & Naftilan 1993).

HU Vir (HD 106225) is an SB1 RS CVn-type system with a K1 subgiant (Cutispoto 1998) and an orbital period of $P_{orb} = 10.38758^d$ (Strassmeier 1994). The rotational photometric period of about $P_{pho} = 10.41^d$ is variable (Strassmeier et al. 1997). In our model we adopt as effective temperature, radius and surface gravity the values proper for the subgiant component: $T_c = 5000$ K, $R_c = 8$ $R_\odot$, $\log g_c = 3.5$ cm s^{-2} (Cox 2000). HU Vir will be treated in the analysis as a single star and proximity and reflection effects will be considered negligible.

RS CVn (HD 114519) is an eclipsing detached binary system consisting of a K2 subgiant and a F5 main-sequence star (Reglero et al. 1990). This system has a mean orbital period of $P_{orb} = 4.797855^d$ (Catalano & Rodonò 1974). The observed photometric variability can be entirely attributed to the subgiant, which is the only magnetically active component. However, the earlier-type component has a slightly larger total flux in the U, B and V bands, which can give a significant contribution to the observed blueing as the brightness of the active component decreases (Aarum Ulvas & Henry 2005). We adopt for the hot and cool component the values of parameters from Rodonò et al. (1995; 2001a): $T_h = 6300$ K, $T_c = 4600$ K, $R_h = 1.89$ $R_\odot$, $R_c = 3.85$ $R_\odot$, $M_h/M_c = 0.96$, $i = 85°$, and $\log g_h = 4.5$, $\log g_c = 3.5$ cm s^{-2}. We find that the variability of RS CVn arising from proximity and reflection effects is about $\Delta V_{ellip} = 0.01$ mag and $\Delta V_{ref} = 4.7 \cdot 10^{-3}$ mag (Morris & Naftilan 1993).

V775 Her (HD 175742) is an SB1 BY-Dra type variable consisting of a K0 and a K5/M2 main-sequence stars and with an orbital period of $P_{orb} = 2.879395^d$ (Imbert 1979). Although both components are expected to be magnetically active, due to their short rotation period and late-spectral type, the luminosity of the K0 component largely dominates the system's luminosity. We adopt for the hot and cool components values of parameters proper for their spectral classes: $T_h = 5300$ K, $T_c = 4000$ K, $R_h = 0.85$ $R_\odot$, $R_c = 0.60$ $R_\odot$, $M_h/M_c \simeq 1.3$, and $\log g_h = 4.5$, $\log g_c = 4.5$ cm s^{-2} (Cox 2000) and an assumed value of $i = 60°$. We find that the variability of V775 Her arising from proximity and reflection effects is about $\Delta V_{ellip} = 1.7 \cdot 10^{-4}$ mag and $\Delta V_{ref} = 6.2 \cdot 10^{-4}$ mag (Morris & Naftilan 1993).

AR Lac (HD 210334) is an eclipsing detached binary system of RS-CVn type consisting of a G2 and a K2 subgiants (Hall 1976). AR Lac has an orbital period of about $P_{orb} = 1.9832142^d$ (Jetsu et al. 1997). The observed photometric variability can be mostly attributed to the K2 subgiant, due to the deeper convection zone with respect to the G2 component. Nonetheless, since both components have similar total fluxes in U, B and V bands, the hotter component may play some role in the observed color variations, as it will be discussed in the following. We adopt for the hot and cool components the values of parameters from Lanza et al. (1998): $T_h = 5560$ K, $T_c = 4820$ K, $R_h = 1.51$ $R_\odot$, $R_c = 2.61$ $R_\odot$, $M_h/M_c = 0.97$, $i = 87°$, and $\log g_h = 4.0$, $\log g_c = 3.5$ cm s^{-2}. We find that the variability of AR Lac arising from proximity and reflection effects is about $\Delta V_{ellip} = 0.027$ mag and $\Delta V_{ref} = 0.010$ mag (Morris & Naftilan 1993).

SZ Psc (HD 219113) is an eclipsing detached binary system belonging to the RS CVn class of variable stars and consisting of an F8 V/IV and a K1 subgiant (Hall 1976). This system has an orbital period of $P_{orb} = 3.9657889^d$. The observed photometric variability arises from the subgiant component which is the only magnetically active component. However, the earlier-type component can give a significant flux contribution to the U band as far as the magnetic activity makes the K1 component fainter. We adopt for the hot and cool components the values of parameters from Lanza et al. (2001) and Eaton & Henry (2007): $T_h = 6100$ K, $T_c = 4900$ K, $R_h = 1.5$ $R_\odot$, $R_c = 6.0$ $R_\odot$, $M_h/M_c = 0.76$, $i = 69°$, and $\log g_h = 4.20$, $\log g_c = 3.23$ cm s^{-2}. We find that the variability of SZ Psc arising from proximity and reflection effects is about $\Delta V_{ellip} = 0.012$ mag and $\Delta V_{ref} = 3.3 \cdot 10^{-3}$ mag (Morris & Naftilan 1993).

II Peg (HD 224085) is an SB1 RS CVn-type binary system with a primary K2 IV component (Rucinski 1977). It has a variable rotational photometric period of about $P_{pho} = 6.720^d$ (Rodonò et al. 2000). We adopt as effective temperature the values from Rodonò et al. (2000), and radius and surface gravity values proper for its spectral class: $T_h = 4600$ K, $R_h = 8$ $R_\odot$, $\log g_h = 3.50$ cm s^{-2}. II Peg will be treated in the analysis as a single star and proximity and reflection effects will be considered negligible.

BY Dra (HD 234677) is an SB2 BY Dra-type binary system consisting of two M0 main-sequence stars (Rodonò & Cutispoto 1992). This system has an orbital period of $P_{orb} = 5.976^d$ (Bopp & Evans 1973) which significantly differs from the rotational photometric period of about $P_{pho} = 3.836^d$ (Rodonò et al. 1983). Both components are expected to equally contribute to the observed photometric variability, their rotation rate and spectral type being equal. We adopt for the components the values of parameters proper for their spectral classes: $T_h = 3700$ K, $R_h = 0.60$ $R_\odot$, $M_h/M_c = 1.0$, and $\log g_h = 4.50$ cm s^{-2} (Cox 2000) and an assumed value of $i = 60°$. We find that the variability of BY Dra arising from proximity and reflection effects is about $\Delta V_{ellip} = 5.5 \cdot 10^{-5}$ mag and $\Delta V_{ref} = 4.0 \cdot 10^{-4}$ mag (Morris & Naftilan 1993).

Brightest V magnitude, maximum V-band light curve amplitude and average B−V and U−B colors of the program stars are listed in Table 1.

3. Observations

The photometric observations were collected by two APTs: the *Phoenix-25* since 1988, and the *APT80/1* since late 1992. The Phoenix-25 is a 25-cm telescope operated under the "rent-a-star" service by the Franklin & Marshall College at Washington Camp (AZ, USA). It feeds a single-channel photon counting photometer, equipped with an uncooled 1P21 photomultiplier and standard *UBV* filters (Boyd et al. 1984; Baliunas et al. 1985). The APT80/1 is a 80-cm telescope located at the *M. G. Fracastoro* station of OAC on Mt. Etna (1725m a.s.l.) that feeds a single channel charge-integration photometer, equipped with an uncooled Hamamatsu R1414 SbCs photomultiplier and standard *UBV* filters (Rodonò & Cutispoto 1992; Messina 1998).

The Phoenix-25 observed the program stars differentially with respect to the comparison (C) and check (CK1) stars listed in Table 2. A detailed description of the observation and reduction procedures for the data collected with this telescope can be found in Rodonò & Cutispoto (1992).

The APT80/1 observed all the program stars differentially with respect to a larger set of comparison stars (all stars in Table 2) including those observed by the Phoenix-

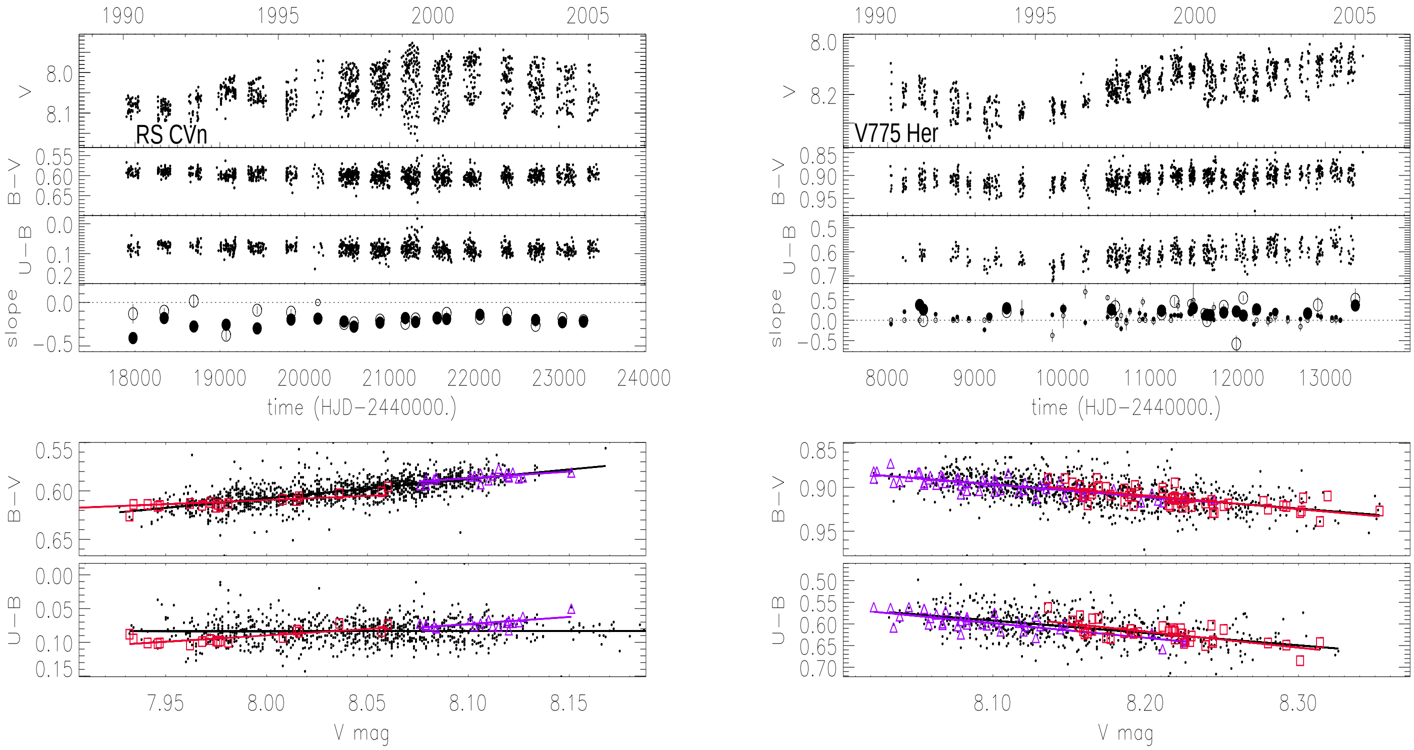

Fig. 6 As in Fig. 2, but for RS CVn and V775 Her.

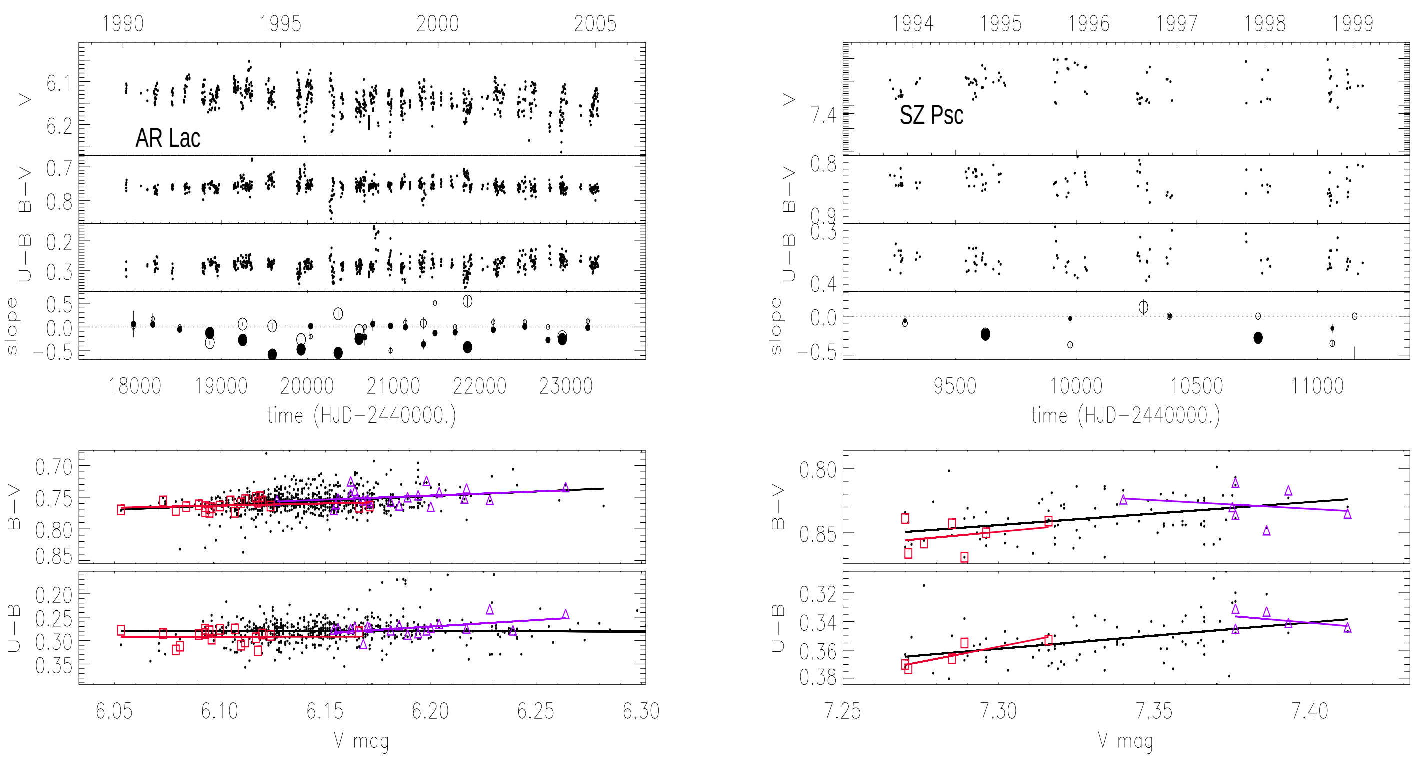

Fig. 7 As in Fig. 2, but for AR Lac and SZ Psc.

25. The integration time in U, B and V filters was set to 15, 10 and 10 s, respectively, and the observing sequence was *n-c-ck1-c-v-v-v-c-v-v-v-c-ck2-c-n*, where the symbol n denotes the bright navigation star, which is the first star of the group the APT80/1 hunts. The sky background was measured at a fixed position near each star.

Differential magnitudes from both telescopes were corrected for atmospheric extinction and transformed into the standard Johnson UBV system. The transformation coefficients were determined quarterly by observing selected samples of standard stars. Due to the relatively short duration of an observing sequence ($\simeq$ 30 minutes), differential

Table 2 V magnitude, B−V and U−B colors of comparison (C) and check (CK) stars.

	Program Star	C/CK Star		V (mag)	B−V (mag)	U−B (mag)
1	AR Psc	HD 7446	(C)	6.04	1.08	1.02
		HD 7804	(CK)	5.16	0.07	0.03
2	VY Ari	HD 17572	(C)	6.72	0.37	−0.03
		HD 17329	(CK1)	7.93	0.76	0.28
		HD 17395	(CK2)	8.45	0.59	0.06
		HD 16187	(CK3)	6.05	1.05	0.88
3	UX Ari	HD 20825	(C)	5.55	1.10	0.92
		HD 20618	(CK1)	5.91	0.86	0.45
		HD 20644	(CK2)	4.47	1.55	1.86
4	V711 Tau	HD 22796	(C)	5.55	0.94	0.67
		HD 22819	(CK1)	6.10	0.99	0.78
		HD 23413	(CK2)	5.56	1.42	1.72
		HD 22484	(CK3)	4.29	0.57	0.05
5	EI Eri	HD 25852	(C)	7.83	1.01	0.78
		HD 25954	(CK1)	7.53	1.24	1.36
		HD 26237	(CK2)	7.17	0.03	0.03
		HD 26409	(CK3)	5.44	0.94	0.67
6	V1149 Ori	HD 37741	(C)	8.19	1.07	0.87
		HD 38145	(CK1)	7.91	0.33	0.06
		HD 38529	(CK2)	5.93	0.78	0.48
		HD 37984	(CK3)	4.91	1.17	1.10
7	DH Leo	HD 86132	(C)	8.17	0.96	0.65
		HD 85428	(CK1)	7.78	1.24	1.33
		HD 88008	(CK2)	8.48	0.74	0.26
		HD 85376	(CK3)	5.30	0.22	0.09
8	HU Vir	HD 106270	(C)	7.59	0.74	0.30
		HD 105796	(CK1)	8.05	1.07	0.96
		HD 105759	(CK2)	6.55	0.22	0.07
		HD 106516	(CK3)	6.12	0.46	−0.14
9	RS CVn	HD 114778	(C)	8.40	0.47	−0.04
		HD 114838	(CK1)	8.08	0.53	0.01
		HD 114863	(CK2)	8.54	0.57	0.02
		BD+362347	(CK3)	9.91	0.50	−0.09
		HD 113797	(CK4)	5.22	−0.07	−0.19
		HD 114357	(CK5)	6.02	1.17	1.16
10	V775 Her	HD 337271	(C)	8.74	1.12	1.00
		HD 337275	(CK1)	8.55	1.25	1.30
		HD 178187	(CK2)	5.85	0.09	0.19
		HD 174160	(CK3)	6.22	0.48	0.02
		HD 175492	(CK4)	4.60	0.78	0.48
11	AR Lac	HD 208728	(C)	6.81	1.19	0.85
		HD 209945	(CK1)	5.10	1.58	1.95
		HD 209219	(CK2)	7.40	1.35	1.56
		HD 210731	(CK3)	7.45	0.57	0.04
12	SZ Psc	HD 219018	(C)	7.74	0.64	0.15
		HD 219150	(CK1)	7.20	0.40	−0.07
		HD 218527	(CK2)	5.46	0.91	0.56
13	II Peg	HD 224016	(C)	8.52	0.78	0.43
		HD 223461	(CK1)	5.96	0.20	0.05
		HD 224895	(CK2)	6.81	1.21	1.17
14	BY Dra	HD 172268	(CK1)	7.89	1.24	1.31
		HD 172468	(CK2)	7.52	1.25	1.16
		HD 169028	(CK3)	6.29	1.10	1.08
		HD 172883	(CK4)	5.98	−0.07	−0.23

values were finally averaged to obtain one single average point. The complete dataset presented in this paper consists of about, 16,000, 12,600 and 10,000 average points in the V, B and U filters (see Table 3). After transformation into the standard system the achieved accuracy of V magnitude, B−V and U−B color indices is of the order of 0.008, 0.010 and 0.012 mag, respectively, for the faintest stars (V≃8.5 mag). A comparison between the standard deviations of ck−c and v−c differential magnitudes shows that the comparison stars have remained constant within the observation accuracy.

Table 3 Total number of averaged observations in the V, B and U band, total number of light curves and interval of time of the photometric monitoring

Program Star	V	B	U	L.C.	Time Range
AR Psc	620	595	555	35	1987-2004
VY Ari	980	966	904	40	1991-2004
UX Ari	1169	1157	1088	37	1990-2004
V711 Tau	747	733	669	31	1990-2004
EI Eri	961	934	829	43	1987-2005
V1149 Ori	1247	1226	1114	35	1989-2004
DH Leo	184	184	179	13	1993-2001
HU Vir	2182	2021	1006	52	1989-2004
RS CVn	1900	1019	969	19	1990-2004
V775 Her	1105	1048	564	54	1990-2004
AR Lac	2348	698	620	23	1990-2004
SZ Psc	185	84	80	8	1993-1998
II Peg	1233	1193	1049	43	1992-2004
BY Dra	734	725	391	42	1990-2004

We could homogenize very well the observations coming from two different telescopes, since they observed a common set of comparison and check stars for many years.

In order to further extend our time series, in the following analysis we made use also of the UBV observations of AR Psc, EI Eri, V1149 Ori and HU Vir collected with the 50-cm telescope at ESO (La Silla, Chile) published by Cutispoto (1990; 1992; 1993). For the eclipsing binary stars AR Lac, RS CVn and SZ Psc, we will consider only the out-of-eclipse observations, being our analysis focused only on the magnitude and color variations arising from the presence of photospheric inhomogeneities. In order to determine the out-of-eclipse phases, we also took into account the orbital period variations.

In order to better investigate the evolution of shape, amplitude and mean magnitude shown by the light curves, the whole data set of each program star was subdivided into a number of light curves. The division was made by selecting time intervals during which the star displayed a stable flux modulation, i.e. no significant differences (smaller than ∼ 0.01-0.02 mag) between observations falling close to each other within 0.01-0.02 dex in rotational phase. That division allowed us to obtain from a minimum of 8 light curves in the case of SZ Psc to a maximum of 54 light curves in the case of V775 Her. In Fig. 1 we plot, as an example, one of the 37 light curves in which the complete series of observations of UX Ari has been divided. V magnitude, B−V and U−B colors for the mean epoch 1993.82 are plotted vs. rotational phase in the top three panels of Fig. 1. The most relevant properties of the light curves of each program star are listed in the on-line Table 4. Specifically, we give: mean epoch of observations (Mean Epoch), mean (HJD_{mean}), initial (HJD_{ini}) and final (HJD_{end}) heliocentric Julian day, number of points in the light curve (N_m), brightest V magnitude (V_{min}) and light curve peak-to-peak amplitude in the V band (ΔV), B−V and U−B colors, standard deviation (σ_v) of v−c and (σ_{ck1-c}) of ck1−c differential observations, and the telescope used to make the observations.

With the exception of SZ Psc and DH Leo, all the targets were observed in many epochs almost contemporaneously by the two mentioned telescopes. Thanks to the

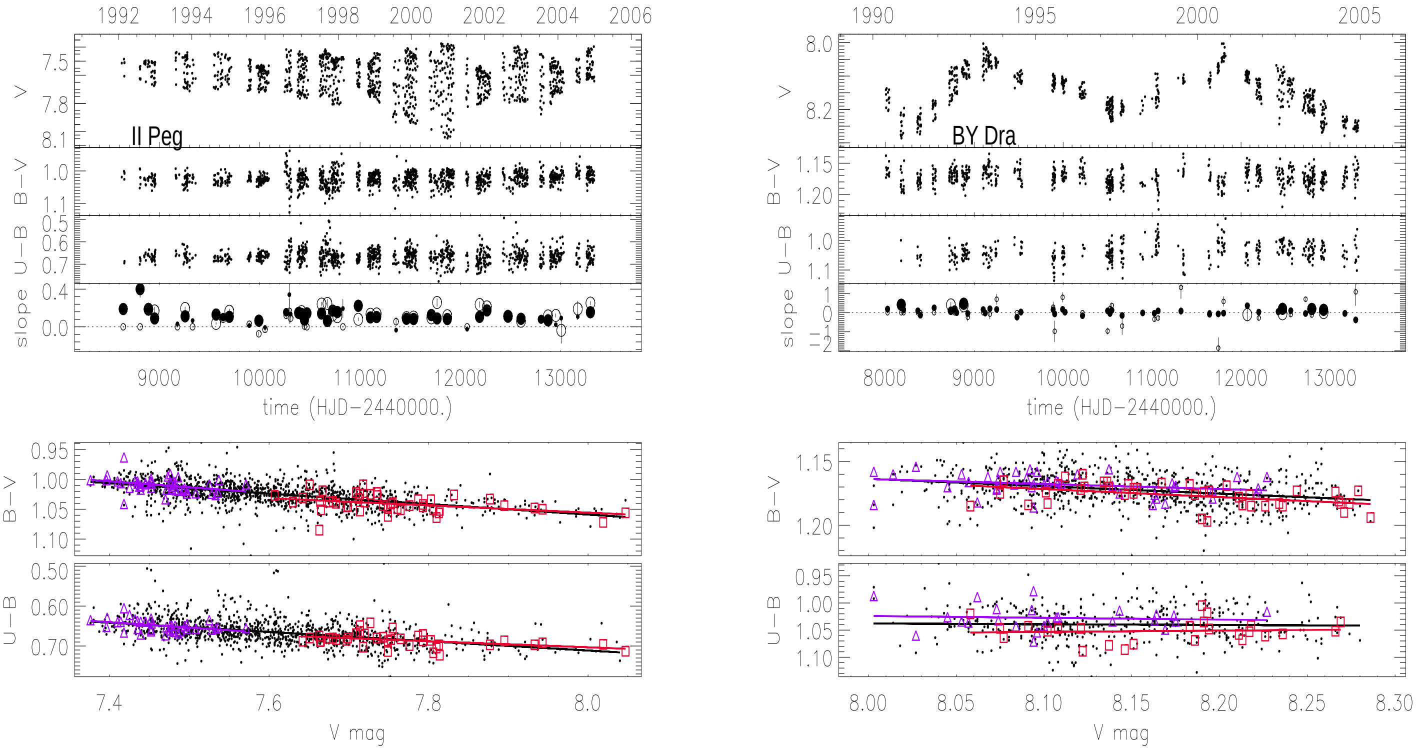

Fig. 8 As in Fig. 2, but for II Peg and BY Dra.

difference in longitude between the two observation sites, that allowed to observe the same stars almost continuously for nine additional hours, we were able to obtain for the short-period stars a set of light curves well covered in rotational phase.

4. V magnitude versus colors variations

In Figs. 2-8 we plot the complete series of V magnitudes (top panel), B−V and U−B colors (second and third panel from top) of our program stars. To date, this UBV database is among the longest and most homogeneous for the program close binary systems. Although their long- and short-term photometric behaviours have been investigated in a number of papers, differently than in previous works mostly based only on V-band data, our data allow us to investigate also the color behaviour on both the short and long timescales and by using a very homogeneous data sample.

4.1. Short-term (rotational) variation

The magnitude and color variations generally shown by active stars and related to magnetic activity have different time scales: the star's rotation modulates the visibility of asymmetrically distributed photospheric temperature inhomogeneities and, as a consequence, gives rise to magnitude and color variations with the same period of the star's rotation period. Within a few stellar rotations, the inhomogeneities grow and decay and change either amplitude and shape of the flux rotational modulation, as well as the mean brightness level. Finally, on a longer timescale, variations of the inhomogeneities total area and their latitudinal migration, which are both related to the presence of starspot activity cycles on a differentially rotating star, cause additional magnitude and color variations (Messina, Rodonò & Cutispoto 2004). In order to separate the effects of rotation from those arising from ARGD and activity cycles, the complete time series of observations of each program star has been divided in a number of light curves, as mentioned in the previous section, i.e., each corresponding to an interval during which the star displayed a stable flux modulation.

For each light curve (see Fig. 1) we have carried out correlation and regression analyses between colors and magnitude variations (B−V and U−B vs. V, and U−B vs. B−V), by computing correlation coefficients (r), their significance level (α), and slopes of linear fits (see lower panels of Fig. 1). The significance level α represents the probability of observing a value of the correlation coefficient larger than r for a random sample having same number of observations and degrees of freedom (Bevington 1969). Correlation analysis allows us to investigate the origin of magnitude and color variations. For example, if these variations originate from a single spot or group of small spots, as well as if they originate from two different, but spatially and temporally correlated, types of inhomogeneities, e.g. cool spots and hot faculae, we expect these quantities to be correlated. On the contrary, a poor correlation or its absence will tell us that magnitude and colors are affected by at least two mechanisms, which are operating independently from each other, either spatially or temporally. As it will be better discussed in Sect. 6, the presence of magnetic activity in the fainter stellar component of the system may also play some role in decreasing the expected correlation. The regression analysis is also important to infer relevant information on the properties of photospheric inhomogeneities, since their average temperature mostly determine the slope

of the fits. Indeed, surface inhomogeneities with different areas but constant temperature, will determine magnitude and color variation of different amplitude but with a rather constant ratio. We have computed the slope b of the linear fit $y = a + bx$ to B−V vs. V (b_{bv}), to U−B vs. V (b_{ub}) and to U−B vs. B−V (b_{ubv}) for each light curve; b_{bv} and b_{ub} values are listed in the on-line Table 5 and plotted in Figs. 2-8 (fourth panel from top) with filled and open circles, respectively. The symbol size indicates different significance levels α of the correlation coefficients r: the largest size is for $\alpha \leq 0.05$, middle size for $0.05 < \alpha \leq 0.1$, and smallest size for $\alpha > 0.1$. The values of the average slopes $< b_{bv} >$, $< b_{ub} >$ and $< b_{ubv} >$, uncertainty, number of light curves used to make the average (only curves with $\alpha < 0.1$) and the slopes minimum and maximum values are listed in the on-line Table 6 and plotted in Fig. 9 (top panel) with filled bullets, open bullets and diamonds, respectively. Targets are just ordered with decreasing value of the average slope.

Correlation and regression analyses have given three important results:

i) magnitude and color variations are found to be correlated to each other only in a fraction of light curves. The percentage of light curves in which V magnitude and color variations are significantly correlated ($\alpha < 0.1$) is over 60% for VY Ari, II Peg, V1149 Ori, HU Vir, UX Ari and RS CVn. These stars will be thereafter named *color-correlated* stars. The percentage is smaller than 40% for BY Dra, V775 Her, EI Eri, DH Leo, AR Lac, V711 Tau, AR Psc, SZ Psc. These stars will be thereafter named *color-uncorrelated* stars. The B−V and U−B vs. V variations are generally found to be correlated more frequently than the U−B vs. B−V variations.

ii) the values of $< b_{bv} >$ and $< b_{ub} >$, as computed by considering values for which $\alpha < 0.1$, are positive for 8 program stars: BY Dra, VY Ari, V775 Her, II Peg, V1149 Ori, HU Vir, EI Eri, DH Leo. It means that along the star's rotation the fainter the star the redder its B−V and U−B colors. These stars will be thereafter named *reddening* stars. Such a behaviour is consistent with a rotational flux modulation dominated by cool spots. The values of $< b_{bv} >$ and $< b_{ub} >$ are negative for 6 program stars: AR Lac, V711 Tau, RS CVn, UX Ari, AR Psc, SZ Psc. It means that along the star's rotation the fainter the star the bluer its B−V and U−B colors. These stars will be thereafter named *blueing* stars. Such a different behaviour may be consistent with a rotational flux modulation dominated either by cool spots, whose negative flux contribution dominates the V-band variation, and by bright faculae, whose positive flux contribution dominates the B- and U-band variations. However, a flux contribution to the B and U bands by an earlier-type stellar companion may also cause a similar blueing, as it will be discussed in Sect. 5.

iii) the values of the b_{bv} and b_{ub} slopes generally vary from light curve to light curve, often within a significant range of values (see the on-line Table 5), indicating that the average temperature of surface inhomogeneities is variable.

Although DH Leo has a negative slope, however its associated uncertainty is large. As better shown in the following, it actually behaves like a *reddening* star. Although the b_{ubv} value is expected to be positive for both *reddening* and *blueing* stars, it is found to be negative more frequently in V711 Tau, AR Lac, AR Psc, BY Dra (see on-line Table 5). For instance, we find than b_{ubv} is negative when the B−V

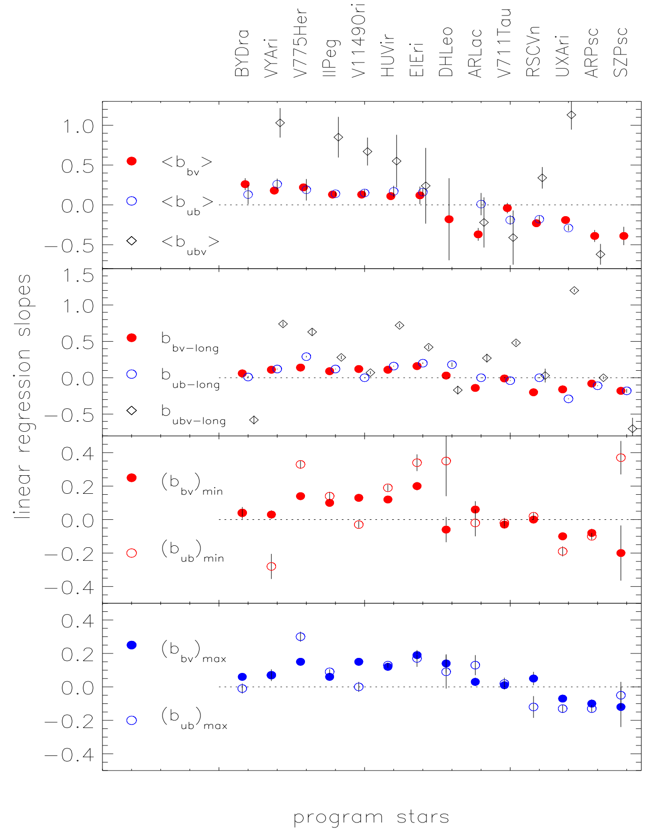

Fig. 9 Average slopes of the color-magnitude and color-color relations ($\alpha > 0.1$) arising from rotational modulation (*top panel*) and from activity cycles or long-term trends (*second panel*). Slopes of the relations between brightest/bluest (*third panel*) and between faintest/reddest light curves values (*fourth panel*).

and U−B vs. V variations are poorly correlated ($\alpha > 0.1$). In Sect. 6 we will show that the presence of an active fainter companion or the presence a facular activity uncorrelated to the spots activity on the rotation time scale may be the reason for the negative slope of b_{ubv}.

4.2. Long-term (cyclical) variation

In order to investigate the relation between color-magnitude and color-color variations arising from activity cycles or long-term trends we have made correlation and linear regression analyses to the complete series of data (small dots in the lower panels of Figs. 2-8). Correlation coefficients (r), significance levels (α), values of the fit slope ($b_{bv-long}$, $b_{ub-long}$ and $b_{ubv-long}$), and number (N) of data used to compute the fits are listed in the on-line Table 7. The slopes $b_{bv-long}$, $b_{ub-long}$ and $b_{ubv-long}$ are plotted in the second panel of Fig. 9 as filled bullets, open bullets and diamonds, respectively. We have made separate fits also to the brightest and bluest values V_{min}, $(B-V)_{min}$, $(U-B)_{min}$ of each light curve (open triangles in lower panels of Figs. 2-8) and to the faintest and reddest values V_{max}, $(B-V)_{max}$, $(U-B)_{max}$ (open squares) and computed the slope values $(b_{bv})_{min}$, $(b_{ub})_{min}$ and $(b_{bv})_{max}$, $(b_{ub})_{max}$. These slopes are also listed in the on-line Table 7 and plotted in the third

and fourth panel of Fig. 9. Here we remind that the brightest magnitude and color values depend on those surface inhomogeneities evenly distributed along the stellar longitude; whereas, the faintest values depend on evenly plus unevenly distributed inhomogeneities. We have also investigated the dependence of the slope values on the mean V magnitude, which is related to the phase of the starspot cycle. In a preliminary investigation, we have considered all the slope values, independently from their significance level, and afterwards a subset of values with high significance ($\alpha \leq 0.1$). The linear fits in both cases are generally in agreement, with the exclusion of AR Psc and AR Lac for which the number of significant values turned out to be small. The results of our investigation are plotted in Fig. 10, where the symbol size indicates the significance of the correlation coefficient as in Fig. 2-8, whereas different symbols indicate different ranges of the correlation coefficients: filled circles for $0 < r \leq 0.2$, asterisks for $0.2 < r \leq 0.4$, diamonds for $0.4 < r \leq 0.6$, squares for $r \geq 0.6$.

Our regression analysis has given the following important results:

i) our program stars show on the long timescales the same behaviour found in the rotation timescale: when activity cycles and/or long-term trends make the star's brightness fainter, all *reddening* stars become redder, whereas all *blueing* stars become bluer. Exceptions are V711 Tau, whose long-term U−B and B−V color variations are found to be un-correlated to the V mag variations and AR Lac, RS CVn and V1149 Ori whose U−B long-term color variations are scarcely correlated to the V mag variations. For instance, in the case of V1149 Ori only data from 2004/2005 make the value of correlation coefficient close to zero.

ii) the reddening slopes related to brightest values and arising from evenly distributed inhomogeneities are similar to the reddening slopes related to the faintest values and arising from evenly plus unevenly distributed inhomogeneities. An exception is represented by VY Ari, whose brightest/bluest slope is negative, instead of being positive. For instance, for the *blueing* stars the brightest light curve values are found to be correlated to the reddest values and the faintest light curve values to the bluest. In other words, as the brightest light curve magnitude faints, the star gets bluer, and when the most spotted hemisphere is in view the star gets even bluer. We note that in the case of BY Dra and SZ Psc the color-color long-term variations, differently than expected, are anti-correlated.

iii) the values of the b_{bv} slope of *reddening* stars is rather independent or slightly decreasing at increasing values of the mean V magnitude. The values of the b_{bv} slope of *blueing* stars becomes more negative (i.e. due to larger color variations) at increasing values of the mean V magnitude. We remind that very cool inhomogeneities do not produce color variation; on the contrary, the warmer the inhomogeneities the larger their color variations. Therefore, when our program stars approach the maximum level of starspot activity, the average temperature of inhomogeneities seems to be constant or slightly decreasing in *reddening* stars, whereas it seems to be increasing in *blueing* stars. Such an increase may arise from an increased flux contribution by hot faculae, as well as by the earlier-type component. Only the *blueing* star SZ Psc and the *reddening* star EI Eri deviate from this behaviour (see Fig. 10). On the other hand, a color variation may arise from the difference of limb-darkening between the most and the least spotted stellar hemisphere, depending on the average latitude in which spots are located.

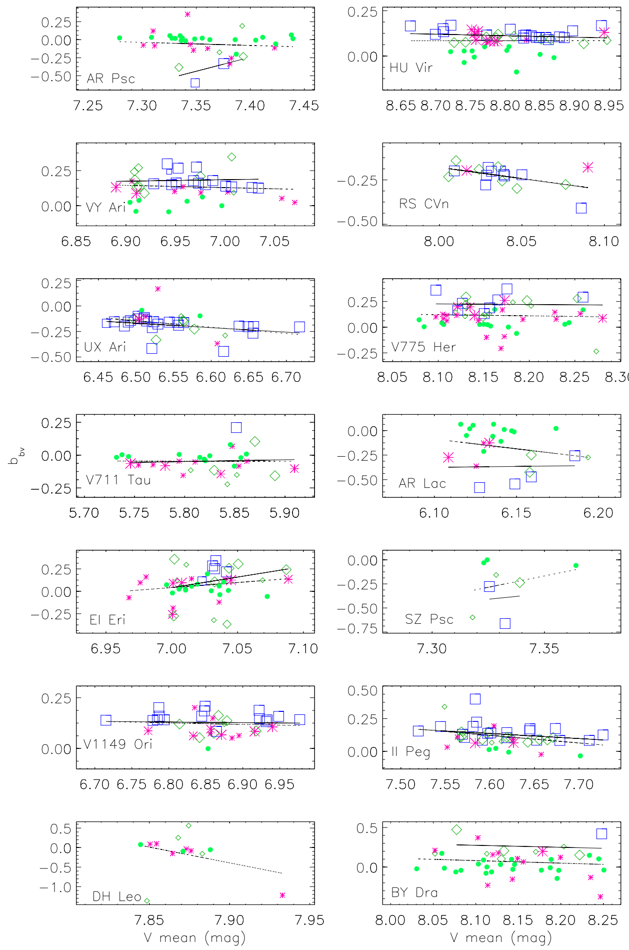

Fig. 10 Slope b_{bv} vs. mean V magnitude. Different symbols and sizes indicate different correlation coefficients and significance levels, respectively (see text). The solid and dotted lines are linear fits to significant values ($\alpha \leq 0.1$) and to all data, respectively.

5. A simple modelling approach

The analysis so far carried out is not enough to understand whether the behaviour shown by *blueing* stars arises from an enhanced flux contribution to the B and U bands by hot faculae or by the presence of the earlier-type component in the binary system, whose relative flux contribution becomes larger when the active late-type component is made fainter by magnetic activity. Additional information on the possible origin of the observed *blueing* is here derived by adopting a first-order modelling. An accurate modelling of the light and color curves of our program stars by using Maximum Entropy and Tikhonov regularization criteria will be carry out afterwards to derive area and temperature of active regions as well as their evolution over the years (see, e.g. Lanza et al. 2006).

5.1. Model

We use the approach proposed by Dorren (1987) to model the amplitudes of the observed V magnitude, B−V and U−B color variations arising from the difference of fluxes in the U, B and V bands between opposite hemispheres of the active component. We take into consideration also the flux coming from the earlier-type component and, whenever it is the case, from a tertiary component. The stellar fluxes were determined by using the NextGen atmosphere models of Hauschildt et al. (1999) for solar metallicity and convolved with the passbands of the UBV system (Johnson 1953) as tabulated in Buser (1978) and Buser & Kurucz (1978). The adopted values of the components stellar effective temperature, radius and gravity are listed in Sect. 2. The mentioned stellar fluxes and physical parameters were used to compute the total flux ratios between the cool and hot components in the U, B and V bands which are listed in Table 1, as well as to compute the magnitude variations arising from proximity and reflection effects according to Eq. (1) and (6) of Morris & Naftilan (1993). We assume that only the component whose total flux dominates the system's luminosity is active. For instance, in the case of BY Dra, although both components have the same spectral class and should have similar levels of magnetic activity, we assume that only one component is active. In the case of RS CVn, the K0 IV component, although less luminous than the F5 IV component, will be considered the active one. Limb-darkening coefficients, different for the unperturbed and the spotted photosphere, are taken from Diaz-Cordoves et al. (1995). We have computed the model magnitude and color variation for a grid of values of temperature and covering fraction of spots and faculae. The covering fraction was varied from 0. to 0.50 with a 0.01 increment, whereas the temperature of the surface inhomogeneities was varied from 3200 K up to 6800 K with a 100 K increment. For instance, we have computed our modelling also for a range of gravity values ($\Delta \log g \pm 1.5$) and effective temperature ($\Delta T_{\rm eff} \pm 150$) for sub-giant non-eclipsing binary stars in our sample, being their values poorly determined. In our modelling approach gravity-darkening effects are neglected by considering that these effects tend to cancel out when computing the flux difference between opposite hemispheres. As reported in Sect. 2, the reflection effect is negligible for all program stars, whereas the proximity effect is marginal for V711 Tau and AR Lac. However, we notice that such an effect does not play any significant role in the observed color variation as verified by using Eq. (1) and (6) of Morris & Naftilan (1993).

5.2. Results

In Fig. 11 for each program star we plot the observed B−V (green filled bullets) and U−B (blue open triangles) vs. V magnitude variations and the model amplitudes (green small dots for B−V and red small crosses for U−B) corresponding to all possible combinations of spot's temperature and area. Specifically, for a given spot temperature the model solutions for different values of filling factor dispose along a dotted-like curve. Dotted-like curves of different slopes correspond to different spot temperatures. As expected, model solutions are not unique: different combinations of temperature and filling factor can determine the same variation amplitudes. In general we found that the

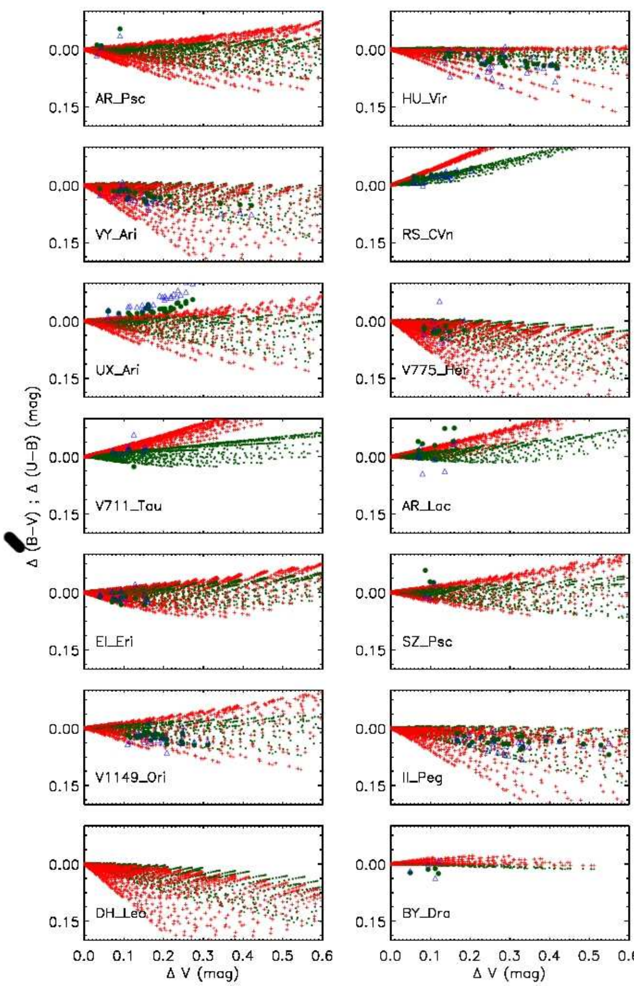

Fig. 11 Results of our model. Green filled bullets (B−V) and blue open triangles (U−B) present the observed magnitude and color variations. Green small dots (B−V) and red small crosses (U−B) represent the family of model solutions.

warmer the spots, the larger are their filling factor to fit the observed amplitude variations. Since our model is not able to obtain unique solutions, we will not focus on the found ranges of temperature and filling factor values, rather we shall discuss the possibility to fit the observed blueing by considering the contribution by earlier-type components. Here we present the results of the modelling for the individual program stars.

AR Psc: color variations are correlated ($\alpha < 0.1$) to V mag variations in 11% of light curves. The model reveals that the observed blueing can be accounted in two out of three mean epochs, and within the photometric accuracy, by the presence of the earlier-type G5/6 V component. In other words, the observed magnitude and color variations in two out of three cases fall within the area of models solutions.

VY Ari: color variations are correlated ($\alpha < 0.1$) to V mag variations in 63% of light curves. Consistently with its classification as spot-dominated star, the observed reddening can be attributed to the presence of spots.

UX Ari: color variations are correlated ($\alpha < 0.1$) to V mag variations in 83% of light curves. The model reveals that the earlier-type G5 V component cannot account for

the observed blueing.
V711 Tau: color variations are correlated ($\alpha < 0.1$) to V mag variations in 29% of light curves. The model shows that the earlier-type G5 V component can account for the observed blueing (except for one mean epoch).
EI Eri: color variations are correlated ($\alpha < 0.1$) to V mag variations in 39% of light curves. Consistently with its classification as spot-dominated star, the observed reddening can be attributed to the presence of spots.
V1149 Ori: color variations are correlated ($\alpha < 0.1$) to V mag variations in 77% of light curves. Notwithstanding the presence of the F8 V component, this star does not show any evidence of blueing. Consistently with its classification as spot-dominated stars, its color variations can be attributed to the only presence of spots.
DH Leo: since no color variations are found to be correlated ($\alpha < 0.10$) to V mag variations, we could not make a comparison with model solutions.
HU Vir: color variations are correlated ($\alpha < 0.1$) to V mag variations in 73% of light curves. Consistently with its classification as spot-dominated star, the observed reddening can be attributed to the presence of spots.
RS CVn: color variations are correlated ($\alpha < 0.1$) to V mag variations in 95% of light curves. The model shows that the flux contribution by the earlier-type F5 V component can account only for the B−V blueing, whereas the U−B color variations are systematically smaller than the model variations.
V775 Her: color variations are correlated ($\alpha < 0.1$) to V mag variations in 38% of light curves. Consistently with its classification as spot-dominated star, the observed reddening can be attributed to the presence of spots.
AR Lac: color variations are correlated ($\alpha < 0.1$) to V mag variations in 39% of light curves. The model, with flux contribution by the earlier-type G2 IV component and spots, fits neither the B−V blueing nor the U−B reddening. If fact, differently than expected in the case of spots, the B−V variations are systematically larger than U−B variations.
SZ Psc: color variations are correlated ($\alpha < 0.1$) to V mag variations in 37% of light curves. The model reveals that the earlier-type component cannot account for the observed blueing.
II Peg: color variations are correlated ($\alpha < 0.1$) to V mag variations in 69% of light curves. Consistently with its classification as spot-dominated star, the observed reddening can be attributed to the presence of spots.
BY Dra: color variations are correlated ($\alpha < 0.1$) to V mag variations in 22% of light curves. Our model cannot fit the observed color variations, likely depending on the assuming that only one component is active and contributing to the observed color variations.
We note that among *blueing* stars, the presence of an earlier-type component can explain the observed blueing only in the case of V711 Tau. As expected for all the *reddening* stars, the spot model can fit the observed color variations in all mean epochs.

6. Discussion

The major result inferred from the analysis presented in Sect. 4 is the existence of *reddening* and *blueing* stars which can be either *color-correlated* or *color-uncorrelated*. As already anticipated, we guess that the existence of different patterns of color variation and different degrees of color-magnitude correlation can mainly arise from two circumstances: *1*) the presence of a fainter component of the binary system whose activity level is not negligible; *2*) the presence of hot faculae either spatially and temporally not correlated to cool spots. The latter represent, in turn, a strong observational evidence in favour of the existence of faculae at least in a few of our program stars.

Let us discuss the first circumstance. The activity level primarily depends on rotation rate and depth of the convection zone (see, e.g., Messina, Rodonò & Guinan 2001; Messina et al. 2003). Specifically, stars with shorter rotation period and deeper convection zone show photometric variability larger than slower-rotating and earlier spectral-type stars. For example, the activity level of the G5 V component of UX Ari is much smaller than that of the K0 IV component, because of the smaller depth of convection zone, although both components have the same rotation period. The luminosity difference between these components makes even more negligible the contribution by the G5 V component to the observed system's variability. In order to quantify this contribution by the earlier-type component, we have taken from the work of Messina et al. (2001) the maximum light curve amplitude expected in the V band for the fainter active component of each program star. Using the $< b_{bv} >$ and $< b_{ub} >$ values from Table 6, although these values refer to the whole system, we have computed the approximate amplitude expected also in the B and U bands. Finally, considering the luminosity ratio between the cool and hot components as listed in Table 1, we have computed the maximum amplitude of the magnitude and color variations which could be attributed to the less active and fainter component. We found that the SB1 stars II Peg, VY Ari, HU Vir, as well the SB2 stars V1149 Ori, RS CVn, whose earlier-type companion is inactive (spectral type earlier than F5 V), or UX Ari, whose earlier-type companion if found with a negligible activity level, are all *color-correlated* stars. In these systems the variability arises from only one component and the color-magnitude variation remains correlated. On the other hand, we found that for V711 Tau, EI Eri, AR Lac, DH Leo and BY Dra the variations arising from the fainter companion are significant, of the order of a few percents of magnitude. All these stars are *color-uncorrelated* (the color-magnitude correlation is lowest for BY Dra, whose components have similar activity levels). We guess that since the surface inhomogeneities are distributed differently on both components, the respective patterns of color variations are not coherent and the correlation is more frequently lost. AR Psc, V775 Her and SZ Psc are the exceptions being *color-uncorrelated*, although the variability contribution by the fainter companion is found to be negligible. The existence of faculae may play a major role in preventing the correlation in these stars. Indeed, we remind that AR Psc and SZ Psc were found to have b_{ubv} negative and with very low significance level, respectively.

Let us discuss the second circumstance. If we consider *color-correlated* stars, we find that the slopes of the colors vs. the V mag variations are not constant vs. time. Since the slope value mostly depends on the average temperature of inhomogeneities, we deduce that it varies vs. time. Such variation may arise from the contemporary presence of inhomogeneities of different temperatures, e.g., cool spots and hot faculae, whose relative area and flux contributions are

variable.

The existence of hot faculae in active stars is documented in a number of works. Light curve inversion methods, widely used to extract information on the properties of stellar active regions, have generally assumed that dark spots are the dominant magnetic feature mainly responsible for the observed brightness variations. Indeed, it has been generally found that for the most active stars, i.e. stars with an activity level much higher than that of the Sun, neither faculae nor network elements are required to obtain quite satisfactory V-band light curve models, the effect of starspots being dominant (e.g. Henry et al. 1995; Lanza et al. 1998). Since the 1990s, some authors began to realize that, for less active stars, the variability at optical wavelengths is significantly influenced, if not dominated, by bright faculae. Radick et al. (1990; 1998) found that the optical brightness of stars of solar age, or older, increases with increasing chromospheric activity level over time scales of several years, suggesting that such brightness enhancement may be mostly attributed to bright features. Radick et al. proposed a scenario according to which young and rapidly rotating stars arrange their surface magnetic flux predominantly into dark spots, whereas, when stars age and their rotation slows down, bright facula-like structures are favoured. However, the rotational modulation of the optical flux remains dominated by dark spots in both young and old stars.

In a pilot program, Mirtorabi et al. (2003) investigated the correlation between the optical light curve and the TiO absorption strength for the evolved chromospherically active star λ And, and found clear evidence that the V-band and near-IR continua light variation primarily arise from bright rather than dark starspots. O'Neal et al. (1998) found, from spectroscopic data, some evidence for multiple temperatures of the brightness inhomogeneities on II Peg. In the most active stars faculae seem to be necessary to account for their UV excess with respect to inactive stars (e.g. Amado 2003). The blueing of three stars in our sample, UX Ari, V711 Tau and RS CVn, has been previously investigated by Aarum Ulvas & Engvold (2003) and Aarum Ulvas & Henry (2005), and attributed to the presence of faculae.

We guess that there are epochs when spots and faculae are spatially associated so that they can produce correlated magnitude and color variations. Although area and/or temperature ratio can change, the correlation is anyway preserved. There are other epochs in which spots and faculae are mostly spatially and temporally uncorrelated, e.g. spots and faculae have lifetimes significantly different and, when new spots or faculae emerge in the photosphere, their phase coherence with older patterns is lost. Although the global activity pattern producing the V-band modulation is stable, that producing the color variation is less stable over the same timescale. In other words, during these epochs faculae seem to act as an interference source which destroys the correlation between color and magnitude variations arising from spots only.

In our sample the *reddening* stars EI Eri, V775 Her and DH Leo and the *blueing* stars SZ Psc and AR Psc, whose fainter components were shown to give no contribution to the observed variability, are the best candidates for hosting faculae which are most of the time uncorrelated with spots. Although the correlation between spots and faculae is absent on the rotational time scale, it is still present on the longer time scale. In fact, as shown in the bottom panels of Fig. 2 and 7, as far as these stars approach the maximum activity level and the total amount of spots increases (making the star fainter), also the total amount of faculae increases (making the star bluer). However, either slope and correlation coefficient are much smaller than in *color-correlated* stars.
Also the remaining *blueing* stars AR Lac, RS CVn, and UX Ari are the best candidates for hosting faculae, since their earlier-type stellar component cannot account for the observed blueing, according to the results of our modelling.

7. Conclusions

The long-term monitoring project of active close binary systems carried out at OAC has allowed us to collect a time-extended database of multiband high-precision photometric observations for a sample of 14 program stars. Correlation, regression analyses, as well as simple modelling approach for these data has allowed us to discover and interpret the existence of color vs. magnitude variations showing different patterns and level of correlations. Here we report the most relevant conclusions of our study:

General conclusions:

- Active close binary systems show magnitude and color variations. Such variations are correlated to each other in a few seasons, whereas the correlation is lost in other seasons. The correlation is found more frequently (in more that 60% of the observed seasons) in single- and double-lined stars in which only one component is active, the other component being inactive (F spectral type or earlier) or with a negligible activity level. The correlation is much less frequent (in less that 40% of observed seasons) in double-lined stars whose fainter component has a non-negligible level of activity. We may guess that in these stars the correlation is prevented by different spot distributions on the two active components.
- The slope of the relation between magnitude and color variations is found to vary from season to season in all stars. Such variation may arise from a variable flux contribution by contemporary present inhomogeneities of different temperature, such as cool spots and hot faculae, which make variable the average temperature and, therefore, the computed relation slope.
- In single- and double-lined stars in which only one component is active the correlation between magnitude and color variation is found in a few seasons to be absent likely because spots and faculae are spatially and temporally uncorrelated. In such cases faculae play like a noise source which makes the observed color pattern highly unstable. In double-lined stars where the fainter component has a significant level of activity, beside faculae, also a different inhomogeneity pattern on the fainter component, can prevent the correlation between magnitude and color variation.
- Our modelling shows that for *blueing* stars an earlier-type component can give a significant contribution to the observed blueing. However, it cannot account alone for the variable slope of the magnitude-color relations.

Specific conclusions:

- II Peg, VY Ari, HU Vir and V1149 Ori are *reddening* and *color-correlated* stars whose variability originates only from the primary component and is dominated by cool spots. However, faculae can be present and vary from time to time the reddening slope, but preserving in most seasons their correlation with spots;

  V775 Her is a *reddening* and *color-uncorrelated* star whose variability originates only from the primary component and it arises from either spots or facular activity not correlated to spots;

  BY Dra, EI Eri and DH Leo are *reddening* and *color-uncorrelated* stars whose variability originates from both components and is dominated by cool spots. The correlation between their magnitude and color variations is frequently lost due to either non-negligible activity level in the fainter companion or presence of faculae non-correlated to spots;

  UX Ari and RS CVn are *blueing* and *color-correlated* stars whose activity takes place only in the primary component. Their short-term color variations are dominated by faculae, which are most of the time correlated to spots. The long-term color variation can partly arise form the hotter companion;

  AR Psc and SZ Psc are *blueing* and *color-uncorrelated* stars whose activity takes place only in the primary component and whose color variations are dominated by faculae which are on the rotation timescale rarely correlated to spot activity;

  AR Lac and V711 Tau are *blueing* and *color-uncorrelated* stars whose activity takes place in both components and whose color variations are dominated by faculae. These are rarely correlated to magnitude variation due to either non-correlated spot/faculae activity on the rotation timescale and a non-negligible activity level in the fainter companion. V711 Tau is the only star in our sample whose blueing, but not the slope variations, could be entirely attributed to the flux contribution by the earlier-type component.

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Online Material

Table 4. Summary of photometric observations: mean epoch of observation, mean, initial and final heliocentric Julian day, number of points in the light curve, brightest V magnitude and light curve peak-to-peak amplitude in the V band, B−V and U−B colors, standard deviation (σ_v) of v−c and (σ_{ck1-c}) of ck1−c differential observations. The telescopes are labelled with 'A': Phoenix-25, 'B': APT80/1, 'C': ESO 50cm.

Mean Epoch	HJD_{mean}	HJD_{ini}	HJD_{end}	N_m	V_{min}	ΔV	B−V	U−B	σ_v	σ_{ck1-c}	Note
					AR Psc						
1987.93	7136.63	7129.64	7143.61	13	7.243	0.072	0.855	0.392	0.026	0.007	C
1989.96	7879.09	7870.61	7887.57	13	7.273	0.056	0.856	0.380	0.022	—	C
1990.83	8195.35	8178.90	8211.80	14	7.299	0.091	0.845	0.393	0.033	0.007	A
1991.82	8556.83	8540.87	8572.78	11	7.343	0.065	0.837	—-	0.021	0.006	A
1992.00	8621.69	8589.79	8653.60	11	7.302	0.107	0.843	0.387	0.039	0.006	A
1992.85	8934.10	8899.83	8968.37	20	7.312	0.056	0.840	0.398	0.018	0.005	A+B
1993.02	8994.98	8978.36	9011.61	17	7.290	0.094	0.856	0.388	0.031	0.005	B
1993.87	9307.52	9247.81	9367.22	28	7.286	0.089	0.849	0.390	0.029	0.005	A+B
1994.66	9593.04	9577.58	9608.51	10	7.362	0.038	0.854	0.370	0.011	0.009	B
1994.89	9679.41	9658.51	9700.31	11	7.340	0.063	0.844	0.385	0.020	0.006	A
1995.49	9898.43	9887.96	9908.91	9	7.321	0.042	0.842	0.399	0.013	0.007	A+B
1995.76	9995.80	9981.84	10009.75	21	7.318	0.032	0.839	0.395	0.010	0.007	A+B
1995.85	10029.09	10011.50	10046.68	14	7.308	0.054	0.836	0.390	0.019	0.014	B
1996.83	10388.10	10374.52	10401.67	10	7.304	0.090	0.833	0.364	0.029	0.003	A+B
1996.94	10429.04	10417.44	10440.65	17	7.308	0.039	0.834	0.382	0.012	0.005	A
1997.06	10472.61	10450.63	10494.58	14	7.282	0.056	0.828	0.385	0.017	0.005	A
1997.76	10728.10	10702.44	10753.75	22	7.269	0.085	0.828	0.386	0.026	0.006	A+B
1997.87	10768.21	10754.74	10781.68	16	7.275	0.067	0.827	0.392	0.019	0.006	A
1997.98	10806.15	10782.69	10829.61	29	7.306	0.039	0.826	0.389	0.009	0.006	A+B
1998.08	10844.10	10832.61	10855.60	16	7.322	0.051	0.829	0.386	0.015	0.006	A
1998.65	11051.50	11039.51	11063.48	8	7.324	0.077	0.835	0.381	0.028	0.006	B
1998.87	11133.74	11078.85	11188.62	63	7.325	0.122	0.825	0.386	0.035	0.006	A+B
1999.08	11209.11	11192.62	11225.60	15	7.360	0.065	0.832	0.372	0.020	0.006	A
1999.82	11480.11	11445.47	11514.74	26	7.370	0.025	0.827	0.391	0.007	0.007	A+B
1999.96	11529.70	11519.72	11539.68	11	7.372	0.030	0.822	0.389	0.010	0.007	A
2000.06	11567.14	11545.68	11588.60	19	7.372	0.043	0.829	0.382	0.015	0.007	A
2000.68	11792.51	11757.57	11827.45	12	7.331	0.059	0.872	0.395	0.020	0.006	B
2000.97	11901.50	11852.41	11950.59	24	7.312	0.186	0.822	0.374	0.064	0.006	A+B
2001.81	12206.99	12166.61	12247.37	22	7.269	0.134	0.841	0.384	0.034	0.006	A+B
2002.02	12283.67	12253.75	12313.59	12	7.364	0.095	0.822	0.370	0.030	0.006	A
2002.77	12555.17	12521.57	12588.76	15	7.399	0.047	0.833	0.370	0.019	0.008	A+B
2003.00	12639.67	12612.72	12666.61	15	7.392	0.063	0.827	0.368	0.016	0.008	A
2003.75	12915.43	12896.97	12933.90	17	7.402	0.075	0.832	0.372	0.019	0.006	A
2003.90	12968.25	12934.82	13001.68	26	7.407	0.062	0.834	0.373	0.017	0.012	A
2004.90	13336.72	13309.78	13363.65	19	7.269	0.159	0.827	0.375	0.059	0.006	A
					VY Ari						
1991.79	8545.90	8531.93	8559.87	19	6.827	0.183	0.977	0.573	0.061	—	A
1991.94	8599.28	8566.88	8631.68	16	6.855	0.182	0.986	–	0.051	—	A
1992.11	8662.13	8636.66	8687.60	20	6.901	0.149	0.980	0.658	0.048	—	A
1992.81	8919.86	8897.91	8941.80	28	6.884	0.168	0.983	0.666	0.050	—	A
1992.92	8961.29	8943.79	8978.78	17	6.899	0.162	0.982	0.655	0.050	—	A
1993.08	9016.64	8988.66	9044.62	16	6.930	0.090	0.983	0.653	0.027	—	A
1993.71	9246.92	9233.97	9259.87	20	6.939	0.127	0.991	0.664	0.042	—	A
1993.99	9350.58	9327.51	9373.65	23	6.899	0.177	0.976	0.649	0.059	0.013	A
1994.12	9398.62	9374.65	9422.59	23	6.899	0.215	0.975	0.673	0.073	0.013	A+B
1994.83	9655.53	9607.56	9703.49	28	6.909	0.128	0.981	0.624	0.040	0.011	A+B
1995.07	9745.90	9715.50	9776.30	13	6.915	0.112	0.953	0.617	0.037	0.011	A+B
1995.74	9986.73	9972.57	10000.88	17	6.857	0.113	0.979	0.657	0.034	0.014	B
1995.82	10018.22	10002.64	10033.81	23	6.865	0.082	0.984	0.653	0.027	0.014	A+B
1995.93	10057.17	10035.63	10078.71	22	6.866	0.093	0.989	0.646	0.033	0.014	A+B
1996.07	10110.13	10088.68	10131.59	26	6.889	0.039	0.976	0.652	0.012	0.014	A
1996.90	10413.44	10388.42	10438.45	16	6.878	0.167	0.973	0.617	0.058	0.015	B
1997.07	10475.84	10453.43	10498.25	18	6.864	0.155	0.977	0.609	0.053	0.015	B
1997.84	10755.96	10703.47	10808.46	14	6.913	0.089	0.953	0.607	0.023	0.016	B
1998.07	10839.33	10817.42	10861.25	18	6.879	0.128	0.956	0.609	0.039	0.016	B
1998.16	10873.26	10864.25	10882.27	7	6.903	0.081	0.965	0.607	0.029	0.016	B
1998.70	11070.10	11039.56	11100.64	21	6.953	0.107	0.973	0.607	0.032	0.020	B

Table 4 (cont'd)

Mean Epoch	HJD_{mean}	HJD_{ini}	HJD_{end}	N_m	V_{min}	ΔV	B−V	U−B	σ_v	σ_{ck1-c}	Note
1998.90	11144.97	11122.46	11167.48	10	6.952	0.210	0.984	0.623	0.069	0.020	B
1999.04	11194.42	11176.45	11212.38	12	6.925	0.167	0.987	0.565	0.053	0.020	B
1999.72	11443.15	11436.65	11449.65	4	6.924	0.145	1.002	0.607	0.068	0.014	B
1999.93	11518.03	11506.57	11529.49	6	6.921	0.298	0.954	0.609	0.121	0.014	B
2000.75	11817.97	11772.51	11863.42	57	6.823	0.421	0.987	0.687	0.147	0.007	A+B
2000.93	11885.70	11865.74	11905.66	27	6.831	0.392	0.987	0.677	0.143	0.007	A
2001.06	11934.13	11906.66	11961.59	34	6.829	0.343	0.980	0.674	0.123	0.007	A+B
2001.74	12181.79	12164.94	12198.63	31	6.855	0.191	0.991	0.674	0.054	0.005	A+B
2001.85	12220.23	12201.89	12238.57	25	6.871	0.156	0.987	0.663	0.053	0.005	A+B
2001.95	12256.25	12240.76	12271.74	19	6.877	0.151	0.982	0.665	0.040	0.005	A+B
2002.06	12296.66	12275.71	12317.61	19	6.941	0.072	0.982	0.678	0.022	0.005	A
2002.77	12556.37	12537.92	12574.81	29	6.860	0.088	0.976	0.683	0.024	0.005	A
2002.91	12608.74	12583.82	12633.66	29	6.880	0.096	0.971	0.670	0.030	0.005	A
2003.03	12652.63	12634.65	12670.60	28	6.866	0.086	0.973	0.673	0.027	0.006	A
2003.76	12917.35	12894.92	12939.79	60	6.858	0.105	0.975	0.671	0.028	0.005	A
2003.91	12971.78	12947.80	12995.76	45	6.844	0.092	0.974	0.675	0.025	0.008	A
2004.06	13026.63	12999.66	13053.60	16	6.880	0.060	0.966	0.676	0.020	0.008	A
2004.73	13273.39	13255.86	13290.91	38	6.836	0.154	0.974	0.669	0.046	0.006	A
2004.94	13348.71	13291.82	13405.60	86	6.832	0.158	1.076	0.768	0.047	0.006	A
				UX Ari							
1990.04	7907.70	7893.72	7921.69	12	6.450	0.103	0.865	0.392	0.040	0.006	A
1990.15	7948.64	7926.68	7970.60	12	6.474	0.078	0.867	0.375	0.024	0.006	A
1990.81	8188.94	8168.98	8208.90	26	6.477	0.061	0.862	0.389	0.016	0.009	A
1991.01	8262.26	8228.84	8295.68	17	6.509	0.040	0.855	0.374	0.013	0.009	A
1991.82	8555.41	8529.95	8580.87	22	6.498	0.057	0.855	0.337	0.014	0.008	A
1992.09	8655.67	8630.70	8680.64	17	6.491	0.060	0.852	0.379	0.017	0.008	A
1992.78	8909.17	8878.46	8939.87	29	6.396	0.202	0.860	0.380	0.054	0.009	A+B
1992.94	8964.78	8940.88	8988.68	26	6.416	0.174	0.860	0.371	0.063	0.009	A+B
1993.12	9033.53	9001.46	9065.60	19	6.402	0.218	0.854	3.087	0.071	0.009	A+B
1993.82	9285.90	9233.98	9337.82	53	6.408	0.206	0.856	0.382	0.061	0.009	A+B
1994.09	9386.01	9353.40	9418.63	10	6.362	0.197	0.868	0.373	0.065	0.009	A+B
1994.83	9655.57	9607.63	9703.52	27	6.380	0.225	0.865	0.382	0.076	0.008	A+B
1995.13	9767.87	9737.45	9798.28	15	6.398	0.146	0.870	0.386	0.051	0.009	A+B
1995.80	10009.86	9981.88	10037.85	39	6.422	0.203	0.855	0.358	0.058	0.009	A
1995.91	10049.55	10039.75	10059.35	13	6.444	0.155	0.855	0.356	0.039	0.009	A
1996.07	10107.99	10074.39	10141.59	38	6.460	0.190	0.850	0.355	0.060	0.009	A
1996.89	10410.05	10386.41	10433.69	31	6.435	0.218	0.851	0.370	0.068	0.007	A+B
1997.04	10463.40	10435.48	10491.32	36	6.401	0.256	0.858	0.380	0.078	0.007	A
1997.15	10507.12	10494.63	10519.60	10	6.465	0.197	0.846	0.363	0.068	0.007	A
1997.74	10720.63	10702.45	10738.81	28	6.368	0.233	0.861	0.389	0.067	0.007	A+B
1998.09	10848.64	10814.67	10882.60	49	6.368	0.243	0.856	0.390	0.078	0.007	A+B
1998.77	11096.23	11039.57	11152.89	74	6.430	0.168	0.860	0.498	0.049	0.007	A+B
1999.05	11198.60	11157.56	11239.63	53	6.430	0.147	0.863	0.376	0.045	0.006	A+B
1999.77	11461.93	11447.86	11476.00	27	6.501	0.111	0.849	0.362	0.034	0.006	A+B
1999.87	11497.24	11477.96	11516.52	34	6.505	0.115	0.850	0.360	0.031	0.006	A+B
2000.10	11580.69	11546.76	11614.61	37	6.497	0.133	0.848	0.358	0.036	0.009	A+B
2000.68	11795.09	11775.59	11814.59	15	6.489	0.142	0.858	0.357	0.041	0.009	A+B
2000.86	11858.31	11810.88	11905.74	95	6.534	0.087	0.843	0.348	0.025	0.009	A+B
2001.08	11939.69	11907.74	11971.64	40	6.544	0.082	0.850	0.341	0.019	0.007	A+B
2001.76	12185.76	12163.58	12207.94	22	6.591	0.034	0.847	0.314	0.011	0.007	A+B
2001.90	12239.33	12210.91	12267.76	19	6.597	0.043	0.844	0.335	0.012	0.007	A+B
2002.04	12291.72	12268.77	12314.66	15	6.586	0.061	0.844	0.340	0.022	0.006	A
2002.86	12590.36	12537.97	12642.75	53	6.576	0.161	0.834	0.339	0.047	0.009	A
2003.09	12676.19	12643.77	12708.62	19	6.575	0.161	0.830	0.330	0.048	0.009	A
2003.76	12915.93	12894.95	12936.92	34	6.531	0.236	0.833	0.332	0.074	0.007	A
2004.01	13008.71	12945.81	13071.62	35	6.509	0.256	0.839	0.343	0.069	0.012	A
2004.94	13348.26	13255.89	13440.62	68	6.581	0.273	0.826	0.319	0.088	0.008	A

Table 4 (cont'd)

Mean Epoch	HJD_{mean}	HJD_{ini}	HJD_{end}	N_m	V_{min}	ΔV	B−V	U−B	σ_v	σ_{ck1-c}	Note
					V711 Tau						
1990.79	8181.93	8168.96	8194.89	23	5.774	0.082	0.886	0.461	0.024	0.006	A
1990.89	8217.85	8199.89	8235.82	16	5.768	0.085	0.884	0.462	0.030	0.004	A
1991.02	8266.19	8250.74	8281.64	10	5.771	0.070	0.888	0.466	0.022	0.002	A
1991.14	8308.12	8290.66	8325.59	17	5.779	0.081	0.895	0.463	0.028	0.005	A
1991.77	8540.39	8531.91	8548.86	13	5.818	0.059	0.894	0.461	0.020	0.007	A
1991.85	8567.35	8551.91	8582.79	14	5.811	0.082	0.895	0.433	0.023	0.008	A
1991.98	8614.74	8589.83	8639.65	9	5.815	0.094	0.891	—	0.035	0.011	A
1992.10	8661.14	8640.68	8681.60	15	5.814	0.057	0.893	0.470	0.018	0.005	A+B
1993.79	9278.41	9261.89	9294.93	24	5.822	0.096	0.900	0.491	0.034	0.004	A+B
1993.90	9315.62	9297.80	9333.44	24	5.776	0.171	0.900	0.489	0.048	0.003	A+B
1994.09	9386.64	9355.69	9417.59	30	5.834	0.112	0.894	0.458	0.036	0.007	A+B
1995.76	9996.91	9981.89	10011.94	27	5.786	0.140	0.897	0.458	0.043	0.008	A
1996.07	10110.66	10089.71	10131.61	17	5.820	0.068	0.899	0.449	0.022	0.008	A
1996.91	10415.80	10391.91	10439.69	51	5.742	0.166	0.901	0.466	0.052	0.009	A+B
1997.06	10471.17	10440.71	10501.64	39	5.753	0.153	0.903	0.468	0.052	0.009	A+B
1997.81	10743.92	10726.87	10760.96	33	5.800	0.072	0.905	0.471	0.021	0.008	A
1997.90	10779.33	10762.78	10795.88	28	5.808	0.075	0.906	0.473	0.021	0.008	A
1997.99	10811.23	10796.74	10825.71	20	5.820	0.059	0.911	0.470	0.016	0.008	A
1998.19	10882.62	10872.63	10892.61	11	5.796	0.049	0.900	0.469	0.018	0.008	A
1998.74	11085.59	11061.56	11109.62	35	5.690	0.095	0.909	0.470	0.024	0.008	A+B
1998.89	11139.18	11114.89	11163.46	31	5.683	0.098	0.905	0.488	0.030	0.008	A+B
1999.08	11208.70	11181.74	11235.65	28	5.698	0.112	0.904	0.478	0.031	0.008	A
1999.90	11508.32	11459.89	11556.74	48	5.725	0.111	0.906	0.474	0.037	0.012	A
2000.14	11597.18	11572.74	11621.62	12	5.712	0.113	0.905	0.475	0.033	0.012	A
2000.82	11844.34	11805.91	11882.77	39	5.671	0.150	0.901	0.478	0.047	0.007	A+B
2001.01	11913.56	11884.78	11942.34	31	5.667	0.154	0.904	0.483	0.050	0.007	A+B
2001.81	12205.23	12162.61	12247.84	31	5.736	0.117	0.912	0.487	0.037	0.007	A+B
2001.98	12267.76	12251.82	12283.70	6	5.757	0.075	0.909	0.491	0.028	0.008	A
2002.81	12572.37	12537.94	12606.81	22	5.752	0.093	0.906	0.493	0.027	0.007	A
2003.94	12985.28	12908.96	13061.61	14	5.789	0.125	0.912	0.505	0.039	0.009	A
2004.84	13313.36	13259.00	13367.72	29	5.870	0.079	0.923	0.509	0.023	0.006	A
					EI Eri						
1987.93	7136.73	7129.73	7143.72	13	7.011	0.040	0.670	0.164	0.013	—	C
1989.96	7879.24	7869.74	7888.74	10	6.996	0.073	0.673	0.145	0.030	—	C
1990.84	8199.42	8180.96	8217.88	20	6.970	0.081	0.655	0.093	0.029	0.009	A
1991.11	8297.17	8268.75	8325.60	17	7.020	0.044	0.669	0.173	0.015	0.007	A
1991.82	8555.40	8536.95	8573.85	18	6.995	0.083	0.669	–	0.025	0.006	A
1992.08	8652.17	8623.71	8680.63	15	7.012	0.048	0.671	0.099	0.011	0.008	A
1992.80	8914.40	8897.92	8930.87	13	6.958	0.130	0.658	0.221	0.041	0.006	A+B
1993,03	8944.80	9056.60	9000.00	24	6.968	0.065	0.666	0.123	0.041	0.007	A+B
1993.76	9264.97	9247.95	9281.99	16	7.016	0.106	0.674	0.192	0.041	0.008	A+B
1993.90	9317.78	9284.87	9350.69	63	6.998	0.094	0.678	0.125	0.029	0.008	A+B
1994.05	9373.00	9327.39	9418.61	25	6.966	0.151	0.675	0.189	0.049	0.008	A+B
1994.94	9697.44	9643.53	9751.35	11	7.035	0.075	0.691	0.141	0.025	0.008	A+B
1995.86	10030.87	9982.99	10078.76	42	7.060	0.057	0.673	0.145	0.013	0.006	A
1996.06	10105.71	10087.73	10123.68	22	7.048	0.078	0.674	0.098	0.025	0.006	A
1996.90	10412.92	10392.95	10432.89	27	7.000	0.087	0.670	0.099	0.026	0.006	A
1997.01	10452.80	10434.88	10470.72	16	6.995	0.070	0.664	0.101	0.021	0.006	A
1997.12	10495.69	10477.73	10513.65	24	6.978	0.074	0.668	0.090	0.019	0.006	A
1997.77	10730.91	10718.86	10742.96	25	7.006	0.042	0.663	0.100	0.012	0.008	A
1997.87	10766.85	10749.91	10783.79	40	6.973	0.093	0.664	0.088	0.023	0.008	A+B
1998.05	10832.55	10808.42	10856.67	26	6.997	0.078	0.670	0.120	0.022	0.008	A+B
1998.76	11092.92	11078.97	11106.86	16	7.030	0.041	0.663	0.110	0.014	0.007	A+B
1998.87	11133.91	11115.90	11151.92	21	7.016	0.049	0.661	0.103	0.016	0.007	A+B
1999.04	11193.74	11181.77	11205.71	8	6.987	0.093	0.663	0.104	0.037	0.007	A+B
1999.11	11222.20	11206.72	11237.68	11	7.010	0.059	0.668	0.104	0.021	0.007	A
1999.82	11477.72	11448.91	11506.53	24	6.961	0.070	0.666	0.099	0.019	0.009	A+B

Table 4 (cont'd)

Mean Epoch	HJD_{mean}	HJD_{ini}	HJD_{end}	N_m	V_{min}	ΔV	B−V	U−B	σ_v	σ_{ck1-c}	Note
2000.03	11556.58	11531.42	11581.73	21	7.011	0.064	0.680	0.127	0.021	0.009	A+B
2000.16	11604.17	11584.72	11623.62	12	6.971	0.088	0.666	0.085	0.026	0.009	A
2000.91	11878.77	11832.87	11924.68	24	6.967	0.070	0.659	0.097	0.017	0.007	A
2001.10	11949.49	11928.34	11970.64	17	6.972	0.069	0.671	0.085	0.017	0.007	A+B
2001.81	12207.02	12166.64	12247.40	41	6.961	0.089	0.666	0.131	0.026	0.007	A+B
2001.99	12269.77	12249.83	12289.71	14	6.953	0.102	0.654	0.084	0.036	0.007	A
2002.13	12322.66	12299.71	12345.61	13	6.988	0.046	0.659	0.086	0.015	0.006	A
2002.77	12555.86	12538.90	12572.83	14	6.921	0.110	0.658	0.087	0.031	0.006	A
2002.94	12619.25	12595.78	12642.72	22	6.925	0.085	0.657	0.077	0.026	0.008	A
2003.07	12668.13	12643.65	12692.60	22	6.942	0.077	0.653	0.074	0.020	0.007	A
2003.75	12913.92	12894.93	12932.92	28	6.976	0.049	0.652	0.069	0.016	0.007	A
2003.86	12953.39	12933.93	12972.85	33	6.968	0.067	0.648	0.073	0.019	0.015	A
2003.96	12990.75	12973.73	13007.77	22	6.977	0.048	0.649	0.071	0.015	0.012	A
2004.06	13028.15	13011.69	13044.62	18	6.949	0.123	0.640	0.067	0.036	0.021	A
2004.17	13067.61	13055.62	13079.60	9	6.977	0.110	0.634	0.060	0.033	0.015	A
2004.76	13284.37	13259.96	13308.78	33	6.953	0.159	0.652	0.069	0.051	0.010	A
2004.88	13328.81	13309.80	13347.82	30	6.929	0.157	0.653	0.082	0.051	0.010	A
2005.07	13398.65	13350.70	13446.60	42	6.949	0.104	0.653	0.085	0.029	0.010	A
				V1149 Ori							
1989.12	7572.15	7548.72	7595.57	12	6.788	0.130	1.163	0.947	0.043	0.007	C
1990.92	8219.54	8183.00	8276.75	19	6.781	0.134	1.137	0.956	0.050	0.007	A
1991.15	8311.05	8291.73	8332.64	14	6.799	0.114	1.143	0.959	0.036	0.008	A
1991.86	8563.60	8537.00	8606.92	22	6.767	0.188	1.139	0.975	0.062	0.007	A
1992.09	8657.49	8630.84	8678.67	9	6.811	0.048	1.135	0.939	0.019	0.007	A
1992.80	8916.86	8896.93	8933.99	20	6.718	0.247	1.141	0.965	0.079	0.010	A
1993.01	8994.02	8957.82	9024.42	31	6.754	0.158	1.155	0.949	0.042	0.010	A+B+C
1993.83	9290.99	9247.99	9337.85	26	6.811	0.149	1.152	0.986	0.042	0.007	A+B
1994.06	9370.60	9353.43	9398.75	20	6.802	0.130	1.149	0.989	0.038	0.007	A+B
1994.18	9423.65	9412.68	9417.96	7	6.908	0.039	1.146	0.995	0.014	0.010	A
1994.99	9714.49	9643.63	9785.34	15	6.828	0.134	1.147	0.941	0.041	0.009	B
1995.82	10019.42	10000.89	10037.95	40	6.800	0.113	1.159	0.956	0.032	0.007	A+B
1995.96	10068.71	10043.66	10093.76	40	6.793	0.156	1.160	0.950	0.052	0.007	A+B
1996.14	10133.69	10096.76	10170.62	33	6.790	0.177	1.150	0.935	0.057	0.007	A+B
1996.92	10421.43	10391.99	10450.88	68	6.689	0.179	1.152	0.949	0.061	0.008	A+B
1997.14	10500.56	10464.84	10536.29	38	6.690	0.208	1.152	0.952	0.075	0.008	A+B
1997.86	10762.93	10718.92	10806.94	49	6.810	0.277	1.165	0.963	0.088	0.007	A
1998.14	10868.09	10814.56	10921.62	44	6.854	0.246	1.170	0.956	0.087	0.007	A+B
1998.79	11103.42	11081.96	11124.88	21	6.835	0.196	1.173	0.954	0.061	0.008	A
1998.98	11172.41	11132.04	11212.78	30	6.818	0.209	1.172	0.965	0.066	0.008	A
1999.19	11247.22	11218.80	11275.65	22	6.838	0.168	1.169	0.972	0.056	0.008	A
1999.86	11493.43	11447.97	11538.89	46	6.826	0.180	1.176	0.963	0.060	0.009	A+B
2000.12	11590.76	11545.88	11635.64	29	6.854	0.172	1.171	0.968	0.053	0.009	A+B
2000.78	11830.81	11803.63	11858.00	23	6.861	0.141	1.161	0.974	0.052	0.005	A+B
2001.03	11920.58	11876.83	11964.33	58	6.825	0.186	1.162	0.975	0.061	0.005	A+B
2001.18	11975.68	11953.73	11997.63	19	6.816	0.118	1.155	0.986	0.040	0.005	A
2001.84	12219.28	12193.01	12245.55	21	6.818	0.083	1.160	0.975	0.026	0.008	A+B
2002.02	12284.29	12261.88	12306.71	25	6.790	0.109	1.155	0.972	0.035	0.008	A
2002.17	12335.17	12311.70	12358.64	28	6.791	0.116	1.160	0.934	0.042	0.008	A
2002.80	12566.92	12538.00	12595.85	45	6.739	0.151	1.152	0.973	0.041	0.008	A
2002.98	12633.22	12601.76	12664.68	52	6.680	0.213	1.155	0.973	0.054	0.010	A
2003.17	12700.65	12665.68	12735.62	36	6.673	0.198	1.141	0.969	0.054	0.011	A
2003.86	12953.37	12895.00	13011.74	**	6.629	0.311	1.150	0.979	0.103	0.009	A
2004.13	13054.19	13013.74	13094.63	45	6.663	0.248	1.143	0.977	0.086	0.022	A
2004.97	13358.78	13255.93	13461.62	**	6.593	0.244	1.139	0.999	0.072	0.010	A
				DH Leo							
1993.30	9095.82	9067.30	9124.34	21	7.848	0.033	0.898	0.485	0.010	0.008	B
1995.17	9777.96	9743.55	9812.37	18	7.811	0.079	0.899	0.478	0.027	0.01	B

Table 4 (cont'd)

Mean Epoch	HJD_{mean}	HJD_{ini}	HJD_{end}	N_m	V_{min}	ΔV	B−V	U−B	σ_v	σ_{ck1-c}	Note
1997.14	10501.58	10481.58	10521.58	9	7.830	0.037	0.883	0.473	0.010	0.008	B
1997.30	10560.36	10548.33	10572.40	9	7.850	0.049	0.875	0.484	0.014	0.008	B
1997.37	10585.33	10577.34	10593.32	12	7.804	0.138	0.885	0.477	0.049	0.010	B
1998.04	10829.15	10814.63	10843.67	10	7.792	0.125	0.889	0.498	0.043	0.011	B
1998.35	10939.85	10930.39	10949.31	8	7.813	0.063	0.897	0.507	0.023	0.008	B
1998.86	11128.64	11121.58	11135.70	6	7.825	0.092	0.917	0.495	0.034	0.011	B
1999.07	11206.51	11186.52	11226.50	10	7.836	0.064	0.920	0.428	0.018	0.010	B
2000.09	11580.03	11574.56	11585.49	5	7.922	0.022	0.892	—-	0.009	0.008	B
2000.24	11632.86	11614.41	11651.32	8	7.795	0.176	0.912	0.452	0.073	0.011	B
2000.31	11657.87	11654.29	11661.45	26	7.805	0.142	0.903	0.474	0.042	0.008	B
2001.11	11949.62	11934.66	11964.57	42	7.855	0.066	0.910	0.503	0.019	0.009	B
				HU Vir							
1989.12	7571.81	7548.86	7594.76	23	8.669	0.147	0.999	0.639	0.051	0.007	C
1990.18	7955.70	7949.73	7961.67	13	8.549	0.228	1.023	0.631	0.081	0.008	C
1991.11	8299.88	8268.95	8330.80	22	8.577	0.244	1.003	0.631	0.074	0.010	B
1991.23	8339.70	8331.76	8347.64	20	8.587	0.248	1.028	0.605	0.074	0.010	C
1991.34	8379.19	8350.73	8407.66	29	8.603	0.237	1.003	0.642	0.071	0.008	B
1992.04	8638.48	8599.02	8677.93	57	8.663	0.219	0.937	0.631	0.061	0.011	A+B
1992.22	8702.75	8678.78	8726.71	47	8.708	0.194	0.991	0.648	0.056	0.010	A+B
1992.39	8765.65	8732.66	8798.65	60	8.733	0.265	1.014	0.675	0.071	0.012	A+B
1993.03	8999.49	8954.04	9044.93	76	8.701	0.166	0.946	0.622	0.043	0.009	A+B
1993.25	9079.79	9051.82	9107.76	97	8.681	0.194	0.998	0.618	0.050	0.010	A+B
1993.41	9137.15	9113.65	9160.65	56	8.682	0.215	1.003	0.626	0.062	0.009	A+B
1994.02	9360.47	9335.01	9385.94	68	8.681	0.149	1.005	0.636	0.036	0.009	A+B
1994.22	9431.81	9386.86	9476.75	**	8.711	0.118	1.001	0.632	0.029	0.010	A+B
1994.40	9497.66	9477.68	9517.65	29	8.683	0.144	0.999	0.650	0.032	0.011	A+B
1995.05	9739.29	9732.80	9745.79	12	8.642	0.136	0.996	0.608	0.056	0.009	C
1995.46	9885.65	9877.65	9893.65	20	8.642	0.197	1.006	0.608	0.071	0.012	A+B
1996.11	10124.41	10078.02	10170.81	63	8.589	0.274	0.997	0.622	0.074	0.009	A+B
1996.32	10202.18	10187.67	10216.69	24	8.666	0.172	1.000	0.638	0.054	0.009	A
1996.42	10236.21	10218.76	10253.66	25	8.663	0.155	1.006	0.631	0.051	0.009	A
1996.93	10423.47	10409.00	10437.94	18	8.629	0.184	1.004	0.620	0.061	0.012	A+B
1997.09	10483.71	10467.54	10499.88	30	8.677	0.193	1.001	0.638	0.045	0.012	A+B
1997.21	10525.33	10500.91	10549.75	45	8.699	0.123	1.012	0.654	0.040	0.012	A+B
1997.32	10566.70	10550.67	10582.72	32	8.681	0.141	1.014	0.664	0.045	0.012	A
1997.43	10606.66	10590.66	10622.66	24	8.632	0.282	1.019	0.663	0.094	0.012	A
1997.93	10789.03	10768.02	10810.05	29	8.623	0.407	1.020	0.661	0.128	0.009	A
1998.11	10856.31	10814.91	10897.72	66	8.620	0.419	1.027	0.654	0.119	0.009	A
1998.29	10919.22	10903.76	10934.68	41	8.698	0.360	1.028	0.672	0.113	0.009	A
1998.42	10965.67	10936.67	10994.67	34	8.693	0.338	1.021	0.648	0.132	0.009	A+B
1998.93	11155.46	11133.02	11177.90	22	8.717	0.227	1.016	0.639	0.075	0.013	A
1999.05	11199.37	11181.90	11216.83	35	8.741	0.221	1.015	0.649	0.068	0.013	A
1999.21	11254.84	11222.87	11286.81	44	8.756	0.188	1.017	0.643	0.057	0.013	A
1999.40	11324.17	11287.68	11360.67	53	8.787	0.166	1.024	0.658	0.052	0.013	A
1999.93	11519.03	11504.01	11534.04	18	8.789	0.299	1.020	0.662	0.088	0.012	A
2000.03	11557.43	11536.03	11578.84	33	8.824	0.237	1.022	0.671	0.061	0.012	A+B
2000.13	11593.86	11579.85	11607.88	18	8.808	0.277	1.029	0.679	0.108	0.012	A
2000.24	11633.24	11612.76	11653.71	42	8.769	0.288	1.018	0.644	0.084	0.012	A+B
2000.40	11689.19	11666.70	11711.67	26	8.726	0.342	1.026	0.655	0.127	0.012	A
2000.97	11899.01	11862.02	11935.99	47	8.655	0.407	1.021	0.662	0.145	0.011	A+B
2001.17	11970.32	11943.83	11996.82	51	8.645	0.385	1.010	0.658	0.116	0.011	A+B
2001.30	12020.27	12001.78	12038.76	34	8.655	0.343	1.006	0.643	0.108	0.011	A+B
2001.42	12060.67	12044.67	12076.67	29	8.663	0.288	1.012	0.652	0.085	0.011	A+B
2002.04	12289.91	12251.02	12328.80	79	8.684	0.402	1.014	0.670	0.138	0.015	A
2002.23	12359.25	12331.75	12386.75	70	8.642	0.414	1.022	0.659	0.129	0.015	A+B
2002.38	12413.69	12390.73	12436.66	58	8.660	0.369	1.026	0.660	0.112	0.015	A+B
2002.94	12617.46	12592.03	12642.89	31	8.673	0.279	1.012	0.677	0.092	0.013	A
2003.10	12678.85	12643.94	12713.76	58	8.660	0.257	1.010	0.644	0.081	0.013	A

Table 4 (cont'd)

Mean Epoch	HJD_{mean}	HJD_{ini}	HJD_{end}	N_m	V_{min}	ΔV	B−V	U−B	σ_v	σ_{ck1-c}	Note
2003.27	12737.25	12718.79	12755.72	38	8.612	0.291	1.011	0.657	0.084	0.012	A
2003.42	12791.66	12764.66	12818.66	38	8.616	0.313	1.026	0.659	0.087	0.010	A
2003.96	12992.44	12961.02	13023.87	50	8.659	0.255	1.021	0.671	0.065	0.016	A
2004.15	13062.29	13031.83	13092.75	47	8.689	0.226	1.021	0.658	0.052	0.011	A
2004.30	13117.17	13094.68	13139.66	37	8.706	0.147	1.028	0.645	0.047	0.023	A
2005.05	13390.92	13323.03	13458.82	49	8.746	0.140	1.026	0.673	0.038	0.018	A
					RS CVn						
1990.23	7976.34	7897.01	8055.67	63	8.057	0.142	0.589	0.079	0.034	0.011	A
1991.24	8343.34	8245.02	8441.65	104	8.060	1.103	0.609	0.084	0.256	0.010	A
1992.19	8692.41	8605.04	8779.79	66	8.036	0.758	0.596	0.082	0.129	0.010	A
1993.24	9073.22	8964.05	9182.38	120	8.008	1.160	0.612	0.093	0.195	0.010	A + B
1994.24	9438.84	9335.04	9542.65	121	8.013	1.104	0.619	0.092	0.249	0.011	A + B
1995.33	9837.53	9770.40	9904.66	93	7.973	1.003	0.661	0.156	0.328	0.007	A + B
1996.19	10153.84	10091.99	10215.69	24	7.971	0.977	0.627	0.123	0.260	0.009	A + B
1997.03	10462.40	10405.04	10519.76	92	7.975	1.145	0.624	0.099	0.259	0.008	A + B
1997.36	10578.73	10520.78	10636.67	122	7.977	1.192	0.627	0.109	0.285	0.008	A + B
1998.20	10884.86	10772.04	10997.68	209	7.948	1.310	0.618	0.102	0.251	0.008	A + B
1999.01	11183.75	11139.03	11228.46	80	7.946	1.362	0.614	0.083	0.232	0.009	A + B
1999.35	11304.61	11230.58	11378.64	119	7.927	1.417	0.621	0.095	0.290	0.009	A + B
2000.04	11558.96	11505.03	11612.89	76	7.964	1.258	0.636	0.107	0.337	0.009	A + B
2000.35	11670.52	11614.63	11726.40	93	7.947	1.163	0.622	0.113	0.254	0.009	A + B
2001.42	12061.54	11872.03	12251.05	128	7.941	0.981	0.637	0.122	0.254	0.008	A + B
2002.29	12381.84	12314.94	12448.74	108	7.934	0.880	0.614	0.108	0.169	0.008	A
2003.22	12718.33	12613.00	12823.66	137	7.962	1.032	0.628	0.111	0.259	0.016	A
2004.08	13033.96	12972.02	13095.90	47	7.976	1.074	0.633	0.123	0.287	0.014	A
2004.76	13282.22	13102.75	13461.69	98	7.981	1.271	0.613	0.091	0.248	0.015	A
					V775 Her						
1990.40	8039.40	8032.86	8045.94	6	8.091	0.163	0.911	–	0.065	0.012	A
1990.82	8192.62	8173.66	8211.57	18	8.159	0.086	0.919	0.627	0.028	0.012	A
1991.30	8365.97	8359.97	8371.97	10	8.135	0.081	0.906	0.593	0.028	0.009	A
1991.42	8409.44	8387.90	8430.98	21	8.144	0.107	0.909	0.613	0.035	0.008	A
1991.80	8549.13	8530.66	8567.59	17	8.179	0.098	0.908	–	0.033	0.008	A
1992.35	8749.40	8718.97	8779.82	26	8.159	0.160	0.910	0.609	0.051	0.008	A
1992.47	8795.92	8781.92	8809.93	20	8.156	0.147	0.907	0.594	0.043	0.010	A
1992.84	8929.10	8911.63	8946.56	15	8.197	0.093	0.919	0.632	0.031	0.010	A
1993.32	9106.45	9101.93	9110.97	9	8.245	0.057	0.921	0.655	0.020	0.010	A
1993.48	9161.86	9127.89	9195.84	28	8.208	0.145	0.921	0.665	0.055	0.010	A
1994.02	9360.54	9219.53	9501.54	19	8.204	0.110	0.923	0.630	0.036	0.012	A+B
1994.50	9534.57	9505.59	9563.54	23	8.226	0.066	0.918	0.634	0.017	0.010	A+B
1995.45	9881.72	9853.56	9909.88	31	8.211	0.090	0.921	0.674	0.027	0.008	A+B
1995.79	10006.60	9982.63	10030.56	25	8.225	0.055	0.917	0.643	0.015	0.007	A+B
1996.48	10257.70	10210.86	10304.54	20	8.128	0.116	0.914	0.628	0.029	0.010	A+B
1997.17	10512.50	10498.04	10526.96	18	8.147	0.092	0.914	0.621	0.029	0.008	A
1997.29	10556.43	10527.95	10584.91	34	8.131	0.084	0.911	0.611	0.021	0.008	A
1997.42	10599.87	10590.77	10608.97	18	8.117	0.107	0.915	0.610	0.035	0.008	A
1997.47	10620.38	10609.83	10630.93	31	8.079	0.150	0.911	0.630	0.039	0.008	A
1997.60	10667.01	10644.54	10689.47	17	8.121	0.096	0.904	0.610	0.033	0.008	B
1997.76	10726.47	10704.29	10748.64	22	8.128	0.098	0.913	0.635	0.028	0.006	A+B
1997.87	10766.59	10751.62	10781.56	13	8.120	0.124	0.914	0.629	0.049	0.006	A
1998.17	10877.50	10857.05	10897.95	18	8.135	0.054	0.906	0.616	0.015	0.007	A
1998.28	10914.90	10903.94	10925.86	19	8.101	0.089	0.906	0.593	0.029	0.007	A
1998.36	10943.91	10929.87	10957.94	14	8.101	0.110	0.897	0.627	0.039	0.007	A
1998.61	11037.51	10966.79	11108.24	32	8.105	0.090	0.904	0.619	0.029	0.007	A+B
1998.86	11129.10	11115.64	11142.57	20	8.067	0.119	0.903	0.612	0.041	0.007	A
1999.15	11237.04	11223.05	11251.03	10	8.066	0.127	0.892	0.595	0.047	0.007	A
1999.27	11277.41	11257.97	11296.85	21	8.045	0.120	0.897	0.594	0.033	0.007	A+B
1999.38	11316.37	11300.85	11331.90	25	8.063	0.093	0.902	0.593	0.030	0.007	A+B

Table 4 (cont'd)

Mean Epoch	HJD_{mean}	HJD_{ini}	HJD_{end}	N_m	V_{min}	ΔV	B−V	U−B	σ_v	σ_{ck1-c}	Note
1999.47	11348.90	11334.83	11362.96	18	8.035	0.125	0.903	0.616	0.036	0.007	A
1999.77	11461.15	11447.65	11474.65	26	8.093	0.084	0.897	0.611	0.027	0.007	A
1999.85	11491.11	11475.65	11506.57	24	8.102	0.057	0.899	0.604	0.017	0.007	A
2000.19	11613.48	11604.01	11622.95	14	8.079	0.140	0.903	0.599	0.052	0.008	A
2000.28	11647.90	11628.94	11666.86	29	8.058	0.185	0.902	0.602	0.062	0.008	A+B
2000.38	11684.34	11667.91	11700.78	18	8.083	0.135	0.904	0.605	0.045	0.008	A
2000.50	11726.22	11701.93	11750.52	22	8.096	0.123	0.894	0.617	0.033	0.009	A+B
2000.80	11839.10	11810.64	11867.57	25	8.083	0.147	0.906	0.597	0.053	0.008	A
2001.20	11983.01	11958.04	12007.99	19	8.069	0.123	0.911	0.591	0.033	0.008	A
2001.42	12062.21	12014.89	12109.53	43	8.055	0.170	0.906	0.606	0.054	0.008	A+B
2001.75	12184.01	12170.35	12197.67	22	8.083	0.140	0.909	0.602	0.046	0.008	A+B
2001.83	12214.62	12198.67	12230.58	17	8.110	0.111	0.898	0.608	0.037	0.008	A+B
2002.19	12345.49	12328.04	12362.93	17	8.039	0.130	0.897	0.584	0.041	0.008	A
2002.27	12373.91	12365.92	12381.90	10	8.052	0.134	0.894	0.568	0.049	0.008	A
2002.42	12427.39	12397.90	12456.88	26	8.077	0.076	0.897	0.565	0.023	0.012	A
2002.81	12570.65	12537.74	12603.56	22	8.077	0.134	0.895	0.606	0.049	0.013	A
2003.21	12714.98	12693.04	12736.92	15	8.055	0.102	0.896	0.573	0.031	0.016	A
2003.43	12796.97	12772.97	12820.96	14	8.024	0.195	0.898	0.600	0.071	–	A
2003.75	12913.66	12896.67	12930.65	20	8.067	0.107	0.893	0.610	0.033	0.009	A
2003.85	12949.60	12932.64	12966.57	20	8.059	0.093	0.890	0.589	0.027	0.013	A
2004.19	13075.48	13058.03	13092.93	10	8.051	0.117	0.886	0.549	0.043	0.013	A
2004.32	13120.86	13102.89	13138.82	18	8.022	0.114	0.887	0.562	0.036	0.15	A
2004.45	13170.37	13148.80	13191.95	13	8.022	0.125	0.891	0.584	0.040	0.013	A
2004.92	13341.85	13255.69	13428.02	29	8.033	0.129	0.897	0.594	0.036	0.013	A
					AR Lac						
1990.25	7982.74	7896.57	8068.92	21	6.105	0.624	0.771	0.311	0.186	0.010	A
1990.86	8206.22	8143.88	8268.56	54	6.093	0.608	0.787	0.309	0.205	0.010	A
1991.71	8517.76	8403.96	8631.57	66	6.084	0.648	0.781	0.327	0.218	0.010	A
1992.67	8866.79	8759.98	8973.60	90	6.096	0.618	0.766	0.287	0.118	0.006	A+B
1993.71	9247.57	9139.56	9355.57	108	6.053	0.665	0.760	0.285	0.156	0.004	A+B
1994.65	9590.16	9518.97	9661.35	43	6.093	0.418	0.743	0.278	0.089	0.007	A+B
1995.57	9924.63	9877.87	9971.40	40	6.079	0.162	0.742	0.301	0.039	0.010	A
1995.87	10036.20	9981.81	10090.58	42	6.073	0.391	0.754	0.278	0.057	0.010	A+B
1996.74	10354.02	10254.47	10453.58	75	6.081	0.689	0.774	0.297	0.158	0.010	A+B
1997.40	10596.43	10557.00	10635.85	43	6.124	0.080	0.755	0.286	0.018	0.010	A+B
1997.59	10663.02	10644.40	10681.65	38	6.095	0.698	0.763	9.999	0.154	0.010	A+B
1997.84	10755.46	10689.36	10821.57	1057	6.107	0.705	0.803	0.385	0.233	0.010	A+B
1998.40	10961.44	10925.99	10996.89	41	6.120	0.645	0.761	0.294	0.155	0.010	A+B
1998.87	11133.19	11078.81	11187.57	41	6.111	0.647	0.758	0.301	0.136	0.010	A+B
1999.45	11342.26	11293.99	11390.54	63	6.095	0.634	0.786	0.330	0.222	0.010	B
1999.81	11476.10	11401.63	11550.57	70	6.084	0.651	0.771	0.311	0.205	0.010	B
2000.45	11709.31	11658.99	11759.62	50	6.119	0.644	0.766	0.332	0.223	0.010	B
2000.84	11853.21	11805.80	11900.61	81	6.118	0.641	0.756	0.301	0.148	0.010	A
2001.66	12151.78	12020.99	12282.57	97	6.090	0.635	0.769	0.294	0.182	0.010	A+B
2002.66	12517.28	12390.99	12643.58	91	6.100	0.660	0.768	0.280	0.184	0.010	A+B
2003.40	12785.43	12750.00	12820.87	19	6.171	0.651	0.806	0.341	0.270	0.010	A
2003.85	12951.23	12894.88	13007.58	54	6.107	0.670	0.770	0.282	0.183	0.010	A
2004.66	13247.28	13123.98	13370.59	64	6.116	0.533	0.770	0.284	0.118	0.011	A
					SZ Psc						
1993.83	9289.87	9228.49	9351.25	19	7.316	0.118	0.839	0.350	0.035	0.010	B
1994.74	9623.38	9541.51	9705.26	61	7.285	0.258	0.848	0.387	0.061	0.012	B
1995.70	9974.43	9905.56	10043.29	22	7.270	0.158	0.838	0.354	0.049	0.021	B
1996.53	10278.50	10252.57	10304.42	17	7.289	0.137	0.824	0.349	0.036	0.02	B
1996.83	10385.89	10374.46	10397.31	7	7.299	0.129	0.851	0.332	0.052	0.011	B
1997.83	10753.79	10702.34	10805.25	13	7.276	0.397	0.854	0.356	0.101	0.016	B
1998.67	11061.44	11039.42	11083.47	24	7.271	0.276	0.850	0.356	0.076	0.011	B
1998.93	11154.31	11121.36	11187.26	22	7.296	0.379	0.868	0.438	0.136	0.013	B

Table 4 (cont'd)

Mean Epoch	HJD_{mean}	HJD_{ini}	HJD_{end}	N_m	V_{min}	ΔV	B−V	U−B	σ_v	σ_{ck1-c}	Note
					II Peg						
1992.04	8638.09	8623.60	8652.57	7	7.482	0.125	1.012	0.691	0.042	0.008	A
1992.50	8806.43	8802.94	8809.92	6	7.537	0.093	1.021	0.683	0.045	0.009	A
1992.72	8887.66	8846.52	8928.80	20	7.497	0.168	1.028	0.665	0.052	0.006	A+B
1992.90	8952.05	8948.39	8955.71	16	7.508	0.167	1.030	0.667	0.066	0.008	A
1993.52	9178.44	9160.97	9195.92	8	7.437	0.230	1.014	0.642	0.077	0.005	A
1993.76	9265.18	9250.87	9279.49	31	7.439	0.258	1.031	0.661	0.094	0.007	A+B
1993.94	9329.67	9299.74	9359.60	10	7.492	0.220	1.025	0.676	0.073	0.012	A
1994.58	9564.07	9541.54	9586.59	15	7.439	0.260	1.028	1.391	0.099	0.010	B
1994.77	9634.00	9607.47	9660.52	18	7.452	0.228	1.340	1.243	0.078	0.010	B
1994.94	9695.85	9676.36	9715.34	14	7.479	0.185	1.026	1.064	0.067	0.009	B
1995.49	9895.26	9878.93	9911.60	20	7.489	0.220	0.666	1.021	0.080	0.008	A+B
1995.76	9995.13	9981.82	10008.43	35	7.533	0.187	1.362	1.184	0.060	0.007	A+B
1995.89	10044.52	10014.72	10074.31	39	7.528	0.186	1.082	1.025	0.055	0.011	A+B
1996.49	10263.54	10247.56	10279.52	16	7.418	0.300	0.993	0.689	0.096	0.010	B
1996.58	10294.53	10289.55	10299.50	9	7.435	0.228	1.051	0.659	0.074	0.009	B
1996.61	10307.49	10299.50	10315.48	11	7.425	0.289	1.040	0.640	0.110	0.010	B
1996.85	10395.61	10392.70	10398.51	20	7.432	0.333	1.029	0.660	0.112	—	B
1996.91	10415.96	10401.65	10430.27	25	7.452	0.291	1.024	0.655	0.103	0.006	A+B
1996.99	10445.42	10436.23	10454.60	16	7.471	0.284	0.972	1.499	0.103	0.005	A
1997.05	10469.59	10457.59	10481.58	11	7.477	0.284	1.024	0.640	0.111	0.009	A
1997.46	10615.92	10596.96	10634.87	33	7.453	0.296	1.024	0.672	0.106	0.011	A
1997.62	10673.99	10644.46	10703.53	37	7.418	0.331	1.049	0.635	0.104	—	B
1997.74	10719.64	10714.78	10724.49	28	7.480	0.330	1.025	0.677	0.124	—	B
1997.89	10772.89	10740.46	10805.33	38	7.476	0.337	1.021	0.674	0.119	0.007	A+B
1998.04	10828.59	10814.60	10842.59	11	7.473	0.263	1.001	0.669	0.089	0.005	A
1998.46	10981.93	10966.95	10996.91	22	7.486	0.198	1.020	0.676	0.070	0.006	A
1998.79	11103.14	11078.84	11127.44	51	7.494	0.259	1.028	0.667	0.084	0.007	A+B
1998.96	11165.15	11128.71	11201.59	50	7.445	0.348	1.023	0.662	0.112	0.005	A+B
1999.49	11358.80	11324.97	11392.62	23	7.470	0.463	1.041	0.686	0.145	0.009	A+B
1999.77	11462.31	11429.84	11494.77	43	7.410	0.485	1.024	0.663	0.164	0.005	A
1999.97	11533.66	11495.74	11571.59	54	7.414	0.529	1.025	0.662	0.178	0.009	A+B
2000.45	11710.46	11689.97	11730.96	18	7.435	0.584	1.028	0.674	0.197	0.010	A
2000.61	11767.59	11735.53	11799.64	19	7.497	0.317	1.035	0.677	0.110	—	B
2000.89	11869.55	11803.51	11935.58	80	7.376	0.671	1.024	0.666	0.217	0.008	A+B
2001.43	12067.46	12055.97	12078.95	13	7.483	0.349	1.023	0.686	0.123	0.009	A
2001.77	12191.62	12157.47	12225.78	49	7.536	0.270	1.032	0.675	0.087	0.006	A+B
2001.97	12264.68	12228.77	12300.59	37	7.571	0.205	1.024	0.674	0.062	0.010	A+B
2002.55	12474.77	12422.96	12526.57	24	7.445	0.348	1.029	0.656	0.107	0.014	A+B
2002.90	12604.73	12537.87	12671.58	77	7.396	0.391	1.016	0.662	0.128	0.010	A
2003.45	12805.43	12783.97	12826.88	17	7.452	0.425	1.015	0.680	0.148	0.009	A
2003.64	12873.90	12828.88	12918.91	30	7.482	0.321	1.024	0.667	0.104	0.009	A
2003.85	12951.75	12923.80	12979.69	39	7.478	0.257	1.019	0.665	0.083	0.014	A
2004.00	13006.12	12980.66	13031.58	22	7.525	0.202	1.016	0.640	0.059	0.011	A
2004.45	13170.93	13149.97	13191.88	17	7.476	0.175	1.000	0.664	0.061	0.010	A
2004.80	13296.78	13258.85	13334.70	55	6.981	0.661	1.015	0.666	0.108	0.010	A
					BY Dra						
1990.37	8025.96	8005.99	8045.93	15	8.137	0.067	1.162	—	0.023	–	A
1990.79	8180.14	8173.66	8186.63	10	8.210	0.076	1.180	1.035	0.027	0.006	A
1990.86	8206.57	8201.59	8211.56	6	8.196	0.075	1.183	—	0.025	0.009	A
1991.30	8366.48	8359.97	8372.99	11	8.221	0.047	1.178	1.045	0.015	0.008	A
1991.38	8394.93	8387.90	8401.96	12	8.196	0.078	1.179	1.062	0.025	0.006	A
1991.80	8550.12	8532.65	8567.59	17	8.173	0.061	1.174	—	0.022	—	A
1992.32	8737.97	8718.97	8756.98	20	8.074	0.112	1.169	1.048	0.036	0.006	A
1992.43	8779.45	8772.92	8785.97	13	8.075	0.076	1.164	1.056	0.027	0.006	A
1992.49	8803.36	8797.81	8808.91	13	8.073	0.080	1.171	1.076	0.033	0.008	A
1992.71	8881.92	8861.48	8902.36	18	8.053	0.049	1.174	1.044	0.014	—	B

Table 4 (cont'd)

Mean Epoch	HJD_{mean}	HJD_{ini}	HJD_{end}	N_m	V_{min}	ΔV	B−V	U−B	σ_v	σ_{ck1-c}	Note
1992.83	8927.96	8909.37	8946.55	17	8.057	0.051	1.167	1.041	0.018	0.013	A+B
1993.31	9101.42	9095.94	9106.91	8	8.003	0.098	1.167	1.049	0.035	0.010	A
1993.37	9124.44	9107.91	9140.97	14	8.014	0.098	1.161	1.045	0.031	0.008	A
1993.52	9176.20	9155.87	9196.54	23	8.027	0.050	1.160	1.062	0.015	0.009	A+B
1993.72	9252.67	9236.66	9268.68	14	8.045	0.030	1.172	1.035	0.010	0.007	A+B
1994.35	9480.92	9452.00	9509.84	9	8.092	0.044	1.163	1.003	0.013	0.009	A+B
1994.47	9524.80	9510.81	9538.80	13	8.083	0.040	1.169	1.028	0.013	0.007	A+B
1995.47	9887.95	9877.94	9897.95	17	8.094	0.052	1.172	1.079	0.015	0.008	A
1995.51	9904.93	9899.94	9909.92	15	8.100	0.037	1.170	1.064	0.010	0.008	A
1995.76	9994.14	9982.65	10005.64	16	8.102	0.049	1.169	1.053	0.013	0.008	A
1995.83	10020.11	10006.64	10033.58	11	8.110	0.038	1.168	1.050	0.013	0.007	A
1996.37	10217.45	10182.97	10251.93	23	8.119	0.048	1.163	1.031	0.014	0.008	A
1997.14	10500.01	10482.06	10517.96	22	8.164	0.049	1.182	1.042	0.014	0.006	A
1997.21	10526.46	10518.01	10534.91	16	8.169	0.057	1.184	1.055	0.019	0.009	A
1997.27	10546.90	10535.91	10557.90	24	8.163	0.073	1.180	1.044	0.024	0.007	A
1997.59	10663.03	10645.58	10680.49	17	8.174	0.043	1.173	1.036	0.012	—	A
1998.22	10893.93	10868.00	10919.86	5	8.162	0.051	1.184	1.035	0.021	0.008	A+B
1998.58	11025.46	11000.59	11050.34	11	8.093	0.101	1.172	1.026	0.033	—	B
1998.69	11067.30	11058.31	11076.30	11	8.094	0.096	1.192	0.990	0.029	—	B
1999.40	11324.45	11282.50	11366.40	16	8.096	0.026	1.160	1.069	0.007	—	B
2000.28	11645.87	11633.91	11657.84	9	8.090	0.044	1.165	1.065	0.013	0.010	A+B
2000.55	11743.53	11735.57	11751.48	10	8.062	0.029	1.183	1.017	0.010	0.007	B
2000.70	11803.34	11781.45	11825.24	15	8.003	0.055	1.185	1.008	0.017	0.008	B
2001.44	12070.36	12047.78	12092.94	26	8.084	0.037	1.164	1.045	0.011	0.006	A+B
2001.79	12199.10	12169.63	12228.57	30	8.108	0.075	1.167	1.035	0.022	0.008	A
2002.39	12417.30	12395.82	12438.78	11	8.068	0.176	1.166	1.023	0.059	0.011	A
2002.80	12566.14	12537.71	12594.57	19	8.107	0.084	1.166	1.031	0.023	0.012	A
2003.24	12724.98	12694.00	12755.96	23	8.143	0.068	1.176	1.038	0.020	0.010	A
2003.42	12794.77	12760.82	12828.73	46	8.139	0.079	1.177	1.038	0.024	0.019	A
2003.79	12927.61	12895.65	12959.57	29	8.175	0.094	1.177	1.034	0.030	0.011	A
2004.44	13166.85	13141.78	13191.91	19	8.222	0.057	1.173	1.103	0.014	0.012	A
2004.77	13288.62	13258.66	13318.58	20	8.227	0.039	1.167	1.061	0.011	0.012	A

Table 5. Summary of regression and correlation analyses: mean epoch of light curve, number of data points, slopes b_{bv}, b_{ub} and b_{ubv} along with correlation coefficients and significance levels.

HJD_{mean}	N_V	b_{bv}	r_{bv}	α	N_{BV}	b_{ub}	r_{ub}	α	N_{UBV}	b_{ubv}	r_{ubv}	α
						AR Psc						
7136.6258	13	0.025	0.188	$\alpha >0.2$	13	0.155	0.188	$\alpha >0.2$	13	0.225	0.103	$\alpha >0.2$
7879.0872	13	−0.077	−0.351	$\alpha >0.2$	13	−0.128	−0.351	$\alpha >0.2$	13	−0.641	−0.547	$0.1< \alpha <0.2$
8195.3506	14	−0.066	−0.259	$\alpha >0.2$	14	−0.165	−0.269	$\alpha >0.2$	13	−0.593	−0.324	$\alpha >0.2$
8556.8265	11	−0.332	−0.722	$\alpha <0.05$	—	—	—	—	—	—	—	—
8621.6923	11	0.021	0.179	$\alpha >0.2$	11	−0.233	0.304	$\alpha >0.2$	6	0.684	0.290	$\alpha >0.2$
8934.0984	20	−0.016	−0.059	$\alpha >0.2$	20	0.028	−0.059	$\alpha >0.2$	20	−0.327	−0.132	$\alpha >0.2$
8994.9811	17	0.024	0.151	$\alpha >0.2$	17	0.083	0.151	$\alpha >0.2$	17	0.676	0.392	$\alpha >0.2$
9307.5154	28	0.018	0.064	$\alpha >0.2$	28	0.055	0.064	$\alpha >0.2$	28	−0.206	−0.269	$0.1< \alpha <0.2$
9593.0432	10	−0.337	−0.262	$\alpha >0.2$	10	−0.674	−0.262	$\alpha >0.2$	10	−0.332	−0.411	$\alpha >0.2$
9679.4076	11	−0.175	−0.454	$\alpha >0.2$	11	−0.101	−0.454	$\alpha >0.2$	11	0.057	0.029	$\alpha >0.2$
9898.4334	9	0.352	0.363	$\alpha >0.2$	9	−0.355	0.224	$\alpha >0.2$	7	−1.163	−0.672	$0.05< \alpha <0.1$
9995.7969	21	−0.384	−0.447	$0.05< \alpha <0.1$	21	0.468	−0.439	$0.05< \alpha <0.1$	20	−0.760	−0.607	$\alpha <0.05$
10029.0912	14	0.055	0.073	$\alpha >0.2$	14	0.079	0.003	$\alpha >0.2$	13	−0.522	−0.752	$\alpha <0.05$
10388.0969	10	−0.599	−0.619	$0.05< \alpha <0.1$	10	−0.400	−0.619	$0.05< \alpha <0.1$	10	0.054	0.089	$\alpha >0.2$
10429.0448	17	0.020	0.023	$\alpha >0.2$	17	0.072	0.023	$\alpha >0.2$	17	−0.707	−0.652	$\alpha <0.05$
10472.6067	14	0.120	0.217	$\alpha >0.2$	14	−0.042	0.217	$\alpha >0.2$	14	−0.916	−0.667	$\alpha <0.05$
10728.0953	21	−0.085	−0.317	$\alpha >0.2$	21	0.043	−0.317	$\alpha >0.2$	21	−0.101	−0.090	$\alpha >0.2$
10768.2086	16	0.032	0.090	$\alpha >0.2$	16	0.093	0.090	$\alpha >0.2$	16	0.107	0.087	$\alpha >0.2$
10806.1497	25	0.056	0.079	$\alpha >0.2$	25	0.407	0.072	$\alpha >0.2$	24	0.010	0.007	$\alpha >0.2$
10844.1016	14	−0.147	−0.355	$\alpha >0.2$	14	−0.049	−0.370	$\alpha >0.2$	13	−1.234	−0.524	$0.1< \alpha <0.2$
11051.4960	8	—	—	—	—	—	—	—	—	—	—	—
11133.7373	61	−0.000	−0.002	$\alpha >0.2$	61	−0.118	−0.012	$\alpha >0.2$	59	−0.151	−0.132	$0.05< \alpha <0.1$
11209.1079	15	0.191	0.401	$\alpha >0.2$	15	−0.165	0.401	$\alpha >0.2$	15	−0.677	−0.512	$0.1< \alpha <0.2$
11480.1051	26	−0.258	−0.211	$\alpha >0.2$	26	−0.403	−0.390	$0.05< \alpha <0.1$	22	−0.152	−0.111	$\alpha >0.2$
11529.7007	11	−0.201	−0.193	$\alpha >0.2$	11	0.210	−0.193	$\alpha >0.2$	11	−0.388	−0.366	$\alpha >0.2$
11567.1414	19	−0.233	−0.463	$0.05< \alpha <0.1$	19	−0.172	−0.539	$\alpha <0.05$	17	−0.343	−0.243	$\alpha >0.2$
11792.5097	10	−0.122	−0.360	$\alpha >0.2$	10	−0.534	−0.332	$\alpha >0.2$	9	−0.993	−0.405	$\alpha >0.2$
11901.4973	18	−0.007	−0.069	$\alpha >0.2$	18	−0.112	0.019	$\alpha >0.2$	17	0.006	0.003	$\alpha >0.2$
12206.9920	19	−0.011	−0.019	$\alpha >0.2$	19	0.155	0.178	$\alpha >0.2$	17	0.282	0.315	$\alpha >0.2$
12283.6701	12	0.033	0.111	$\alpha >0.2$	12	0.054	0.111	$\alpha >0.2$	12	0.684	0.360	$\alpha >0.2$
12555.1668	15	−0.114	−0.375	$\alpha >0.2$	15	−0.071	−0.375	$\alpha >0.2$	15	0.341	0.195	$\alpha >0.2$
12639.6684	15	−0.058	−0.104	$\alpha >0.2$	15	−0.007	−0.025	$\alpha >0.2$	14	−0.688	−0.610	$\alpha <0.05$
12915.4316	17	0.014	0.030	$\alpha >0.2$	17	−0.118	0.030	$\alpha >0.2$	17	−0.003	−0.002	$\alpha >0.2$
12968.2463	26	0.066	0.108	$\alpha >0.2$	26	−0.185	0.201	$\alpha >0.2$	25	−0.004	−0.003	$\alpha >0.2$
13336.7150	19	0.010	0.076	$\alpha >0.2$	19	−0.030	0.076	$\alpha >0.2$	19	−0.164	−0.146	$\alpha >0.2$
						VY Ari						
8545.8999	18	0.089	0.585	$\alpha <0.05$	18	−0.223	0.510	$0.05< \alpha <0.1$	7	1.083	0.222	$\alpha >0.2$
8599.2819	15	0.150	0.648	$\alpha <0.05$	—	—	—	—	—	—	—	—
8662.1343	20	0.092	0.380	$0.1< \alpha <0.2$	20	0.354	0.383	$0.1< \alpha <0.2$	14	0.803	0.409	$0.1< \alpha <0.2$
8919.8557	28	0.178	0.616	$\alpha <0.05$	28	0.282	0.616	$\alpha <0.05$	28	0.855	0.627	$\alpha <0.05$
8961.2857	17	0.150	0.666	$\alpha <0.05$	17	0.396	0.666	$\alpha <0.05$	17	1.196	0.468	$0.1< \alpha <0.2$
9016.6426	15	0.209	0.598	$\alpha <0.05$	15	0.466	0.598	$\alpha <0.05$	15	1.739	0.751	$\alpha <0.05$
9246.9218	20	0.097	0.360	$0.1< \alpha <0.2$	20	0.045	0.360	$0.1< \alpha <0.2$	20	0.888	0.602	$\alpha <0.05$
9350.5797	23	0.179	0.792	$\alpha <0.05$	23	0.194	0.800	$\alpha <0.05$	22	−0.172	−0.067	$\alpha >0.2$
9398.6229	22	0.134	0.692	$\alpha <0.05$	22	0.276	0.766	$\alpha <0.05$	20	0.897	0.501	$\alpha <0.05$
9655.5283	28	0.160	0.611	$\alpha <0.05$	28	0.304	0.611	$\alpha <0.05$	28	0.761	0.527	$\alpha <0.05$
9745.9028	12	0.275	0.741	$\alpha <0.05$	12	0.297	0.741	$\alpha <0.05$	12	0.513	0.369	$\alpha >0.2$
9986.7266	17	0.133	0.586	$\alpha <0.05$	17	0.333	0.586	$\alpha <0.05$	17	1.281	0.503	$0.05< \alpha <0.1$
10018.2249	23	0.175	0.354	$0.1< \alpha <0.2$	23	0.308	0.563	$\alpha <0.05$	20	0.591	0.434	$0.05< \alpha <0.1$
10057.1718	22	0.270	0.469	$0.05< \alpha <0.1$	22	0.053	0.434	$0.05< \alpha <0.1$	14	0.044	0.064	$\alpha >0.2$
10110.1326	25	0.242	0.415	$0.05< \alpha <0.1$	25	0.685	0.428	$\alpha <0.05$	24	0.625	0.379	$0.05< \alpha <0.1$
10413.4382	16	0.032	0.105	$\alpha >0.2$	16	0.338	0.105	$\alpha >0.2$	16	0.106	0.055	$\alpha >0.2$
10475.8387	18	0.298	0.613	$\alpha <0.05$	18	0.244	0.613	$\alpha <0.05$	18	0.410	0.420	$0.1< \alpha <0.2$
10755.9646	14	0.135	0.253	$\alpha >0.2$	14	0.721	0.253	$\alpha >0.2$	14	−0.021	−0.010	$\alpha >0.2$
10839.3306	18	−0.043	−0.132	$\alpha >0.2$	18	0.106	−0.132	$\alpha >0.2$	18	1.064	0.388	$0.1< \alpha <0.2$
10873.2576	7	0.242	0.636	$0.1< \alpha <0.2$	7	0.672	0.636	$0.1< \alpha <0.2$	7	1.081	0.385	$\alpha >0.2$
11070.0962	21	0.347	0.423	$0.05< \alpha <0.1$	21	0.314	0.423	$0.05< \alpha <0.1$	21	−0.046	−0.044	$\alpha >0.2$
11144.9690	10	0.052	0.337	$\alpha >0.2$	10	0.375	0.337	$\alpha >0.2$	10	−0.248	−0.072	$\alpha >0.2$

Table 5 (cont'd)

HJD_{mean}	N_V	b_{bv}	r_{bv}	α	N_{BV}	b_{ub}	r_{ub}	α	N_{UBV}	b_{ubv}	r_{ubv}	α
11194.4158	12	0.093	0.440	$\alpha >0.2$	12	0.037	0.440	$\alpha >0.2$	12	−0.061	−0.032	$\alpha >0.2$
11443.1494	4	—	—	—	—	—	—	—	—	—	—	—
11518.0303	6	0.023	0.212	$\alpha >0.2$	6	0.207	0.212	$\alpha >0.2$	6	0.676	0.262	$\alpha >0.2$
11817.9668	57	0.125	0.854	$\alpha <0.05$	57	0.181	0.854	$\alpha <0.05$	57	1.075	0.781	$\alpha <0.05$
11885.7026	25	0.130	0.928	$\alpha <0.05$	25	0.183	0.932	$\alpha <0.05$	24	1.256	0.893	$\alpha <0.05$
11934.1258	34	0.139	0.864	$\alpha <0.05$	34	0.219	0.913	$\alpha <0.05$	31	1.545	0.895	$\alpha <0.05$
12182.9254	31	0.162	0.630	$\alpha <0.05$	31	0.228	0.631	$\alpha <0.05$	30	−0.159	−0.098	$\alpha >0.2$
12220.2294	25	0.101	0.330	$0.1< \alpha <0.2$	25	0.294	0.395	$0.05< \alpha <0.1$	24	0.097	0.080	$\alpha >0.2$
12256.2544	19	0.267	0.783	$\alpha <0.05$	19	0.165	0.783	$\alpha <0.05$	19	0.273	0.243	$\alpha >0.2$
12296.6624	19	0.062	0.145	$\alpha >0.2$	19	0.455	0.145	$\alpha >0.2$	19	−0.416	−0.232	$\alpha >0.2$
12556.3662	29	0.024	0.063	$\alpha >0.2$	29	0.126	0.063	$\alpha >0.2$	29	0.568	0.311	$0.1< \alpha <0.2$
12608.7390	29	0.156	0.658	$\alpha <0.05$	29	−0.096	0.654	$\alpha <0.05$	28	−0.287	−0.195	$\alpha >0.2$
12652.6279	28	0.184	0.570	$\alpha <0.05$	28	0.265	0.570	$\alpha <0.05$	28	0.244	0.140	$\alpha >0.2$
12917.3536	60	0.088	0.274	$\alpha <0.05$	60	0.136	0.280	$\alpha <0.05$	59	0.895	0.482	$\alpha <0.05$
12971.7784	43	0.131	0.289	$\alpha <0.05$	43	0.072	0.428	$\alpha <0.05$	42	0.424	0.279	$\alpha <0.05$
13026.6316	15	−0.040	−0.064	$\alpha >0.2$	15	0.188	−0.064	$\alpha >0.2$	15	0.199	0.197	$\alpha >0.2$
13273.3853	36	0.038	0.190	$0.1< \alpha <0.2$	36	0.173	0.303	$\alpha <0.05$	34	0.114	0.083	$\alpha >0.2$
13348.7108	85	0.134	0.564	$\alpha <0.05$	85	0.306	0.564	$\alpha <0.05$	85	0.744	0.468	$\alpha <0.05$
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7907.7016	11	−0.093	−0.629	$0.05< \alpha <0.1$	11	−0.238	−0.610	$0.05< \alpha <0.1$	8	−0.628	−0.207	$\alpha >0.2$
7948.6402	9	−0.104	−0.343	$\alpha >0.2$	9	−0.612	−0.713	$\alpha <0.05$	6	1.667	0.697	$\alpha <0.05$
8188.9390	25	−0.043	−0.086	$\alpha >0.2$	25	−0.145	−0.603	$\alpha <0.05$	18	0.194	0.113	$\alpha >0.2$
8262.2590	17	0.167	0.323	$\alpha >0.2$	17	0.031	0.379	$\alpha >0.2$	16	−0.158	−0.082	$\alpha >0.2$
8555.4091	22	−0.332	−0.504	$0.05< \alpha <0.1$	—	—	—	—	—	—	—	—
8655.6713	16	−0.416	−0.665	$\alpha <0.05$	16	−0.209	−0.631	$\alpha <0.05$	12	−0.628	−0.513	$0.05< \alpha <0.1$
8909.1695	29	−0.122	−0.480	$\alpha <0.05$	29	−0.279	−0.450	$\alpha <0.05$	26	0.354	0.272	$0.1< \alpha <0.2$
8964.7791	26	−0.126	−0.857	$\alpha <0.05$	26	−0.247	−0.852	$\alpha <0.05$	25	1.514	0.625	$\alpha <0.05$
9033.5275	19	−0.128	−0.813	$\alpha <0.05$	19	−0.316	−0.829	$\alpha <0.05$	13	1.513	0.674	$\alpha <0.05$
9285.9016	51	−0.113	−0.750	$\alpha <0.05$	51	−0.291	−0.746	$\alpha <0.05$	48	1.424	0.582	$\alpha <0.05$
9386.0149	10	−0.170	−0.670	$0.05< \alpha <0.1$	10	−0.183	−0.321	$\alpha >0.2$	9	−0.387	−0.197	$\alpha >0.2$
9655.5732	27	−0.142	−0.891	$\alpha <0.05$	27	−0.317	−0.891	$\alpha <0.05$	27	1.741	0.841	$\alpha <0.05$
9767.8683	15	−0.155	−0.723	$\alpha <0.05$	15	−0.287	−0.752	$\alpha <0.05$	14	0.679	0.400	$\alpha >0.2$
10009.8628	38	−0.155	−0.860	$\alpha <0.05$	38	−0.319	−0.861	$\alpha <0.05$	36	1.425	0.685	$\alpha <0.05$
10049.5516	13	−0.212	−0.795	$\alpha <0.05$	13	−0.224	−0.851	$\alpha <0.05$	11	1.121	0.682	$\alpha <0.05$
10107.9939	37	−0.161	−0.818	$\alpha <0.05$	37	−0.347	−0.818	$\alpha <0.05$	37	1.158	0.593	$\alpha <0.05$
10410.0522	31	−0.159	−0.868	$\alpha <0.05$	31	−0.280	−0.868	$\alpha <0.05$	31	1.174	0.636	$\alpha <0.05$
10463.4001	34	−0.178	−0.659	$\alpha <0.05$	34	−0.295	−0.659	$\alpha <0.05$	34	0.251	0.187	$\alpha >0.2$
10507.1169	10	−0.163	−0.836	$\alpha <0.05$	10	−0.319	−0.836	$\alpha <0.05$	10	1.195	0.661	$0.05< \alpha <0.1$
10720.6298	28	−0.197	−0.855	$\alpha <0.05$	28	−0.276	−0.858	$\alpha <0.05$	26	0.957	0.728	$\alpha <0.05$
10848.6371	49	−0.158	−0.777	$\alpha <0.05$	49	−0.280	−0.768	$\alpha <0.05$	47	1.229	0.552	$\alpha <0.05$
11096.2277	74	−0.148	−0.627	$\alpha <0.05$	74	−0.210	−0.629	$\alpha <0.05$	73	0.443	0.334	$\alpha <0.05$
11198.5990	53	−0.129	−0.393	$\alpha <0.05$	53	−0.204	−0.393	$\alpha <0.05$	53	0.307	0.288	$\alpha <0.05$
11461.9301	27	−0.189	−0.751	$\alpha <0.05$	27	−0.330	−0.751	$\alpha <0.05$	27	0.908	0.509	$\alpha <0.05$
11497.2370	34	−0.141	−0.465	$\alpha <0.05$	34	−0.343	−0.464	$\alpha <0.05$	33	0.289	0.193	$\alpha >0.2$
11580.6878	37	−0.154	−0.562	$\alpha <0.05$	37	−0.279	−0.562	$\alpha <0.05$	37	0.874	0.520	$\alpha <0.05$
11795.0859	15	−0.099	−0.419	$\alpha >0.2$	15	−0.110	−0.419	$\alpha >0.2$	15	0.328	0.272	$\alpha >0.2$
11858.3076	95	−0.227	−0.582	$\alpha <0.05$	95	−0.214	−0.582	$\alpha <0.05$	95	0.090	0.062	$\alpha >0.2$
11939.6904	40	−0.097	−0.173	$0.1< \alpha <0.2$	40	−0.215	−0.173	$0.1< \alpha <0.2$	40	0.114	0.079	$\alpha >0.2$
12185.7589	22	−0.368	−0.299	$\alpha >0.2$	22	0.874	−0.299	$\alpha >0.2$	22	0.209	0.100	$\alpha >0.2$
12239.3313	19	−0.289	−0.433	$0.1< \alpha <0.2$	19	0.441	−0.433	$0.1< \alpha <0.2$	19	−0.548	−0.206	$\alpha >0.2$
12291.7150	15	−0.445	−0.785	$\alpha <0.05$	15	−0.481	−0.785	$\alpha <0.05$	15	0.960	0.582	$0.05< \alpha <0.1$
12590.3619	53	−0.201	−0.790	$\alpha <0.05$	53	−0.254	−0.777	$\alpha <0.05$	52	0.817	0.596	$\alpha <0.05$
12676.1944	19	−0.267	−0.868	$\alpha <0.05$	19	−0.259	−0.868	$\alpha <0.05$	19	0.661	0.622	$\alpha <0.05$
12915.9339	34	−0.203	−0.893	$\alpha <0.05$	34	−0.340	−0.898	$\alpha <0.05$	33	1.232	0.730	$\alpha <0.05$
13008.7147	35	−0.198	−0.861	$\alpha <0.05$	35	−0.399	−0.872	$\alpha <0.05$	33	1.440	0.780	$\alpha <0.05$
13348.2564	68	−0.205	−0.931	$\alpha <0.05$	68	−0.360	−0.931	$\alpha <0.05$	68	1.553	0.876	$\alpha <0.05$
						V711 Tau						
8181.9252	23	−0.017	−0.071	$\alpha >0.2$	23	−0.223	−0.071	$\alpha >0.2$	23	0.408	0.254	$\alpha >0.2$
8217.8541	15	−0.052	−0.352	$\alpha >0.2$	15	−0.249	−0.352	$\alpha >0.2$	15	0.888	0.246	$\alpha >0.2$

Table 5 (cont'd)

HJD$_{\rm mean}$	N$_V$	b$_{bv}$	r$_{bv}$	α	N$_{BV}$	b$_{ub}$	r$_{ub}$	α	N$_{UBV}$	b$_{ubv}$	r$_{ubv}$	α
8266.1904	10	−0.115	−0.459	α >0.2	10	−0.330	−0.459	α >0.2	10	0.489	0.238	α >0.2
8308.1247	16	−0.031	−0.109	α >0.2	16	−0.192	−0.599	α <0.05	13	0.757	0.324	α >0.2
8540.3890	13	0.067	0.228	α >0.2	13	0.149	−0.342	α >0.2	10	−1.818	−0.452	α >0.2
8567.3503	14	−0.151	−0.478	0.1< α <0.2	—	—	—	—	—	—	—	—
8614.7424	9	−0.047	−0.216	α >0.2	—	—	—	—	—	—	—	—
8661.1394	14	−0.222	−0.487	0.1< α <0.2	14	−0.383	−0.364	α >0.2	12	0.254	0.166	α >0.2
9278.4112	24	0.104	0.501	α <0.05	24	−0.065	0.501	α <0.05	24	−0.148	−0.145	α >0.2
9315.6218	24	0.008	0.048	α >0.2	24	−0.095	−0.117	α >0.2	23	−0.341	−0.228	α >0.2
9386.6440	29	−0.157	−0.588	α <0.05	29	−0.236	−0.588	α <0.05	29	0.632	0.463	α <0.05
9996.9118	27	−0.020	−0.090	α >0.2	27	−0.114	−0.090	α >0.2	27	−0.300	−0.253	α >0.2
10110.6600	17	−0.084	−0.225	α >0.2	17	−0.020	−0.219	α >0.2	16	−0.121	−0.083	α >0.2
10415.7956	50	−0.005	−0.032	α >0.2	50	−0.193	−0.079	α >0.2	48	−0.302	−0.149	0.05< α <0.1
10471.1731	39	−0.115	−0.545	α <0.05	39	−0.171	−0.545	α <0.05	39	0.267	0.211	0.1< α <0.2
10743.9185	33	−0.144	−0.318	0.05< α <0.1	33	−0.217	−0.318	0.05< α <0.1	32	−0.417	−0.315	0.05< α <0.1
10779.3259	28	0.080	0.192	α >0.2	28	−0.046	0.234	α >0.2	27	−0.134	−0.098	α >0.2
10811.2251	19	−0.084	−0.151	α >0.2	19	−0.181	−0.151	α >0.2	19	−0.379	−0.340	α >0.2
10882.6177	11	−0.043	−0.112	α >0.2	11	0.219	−0.199	α >0.2	10	−0.952	−0.447	α >0.2
11085.5876	35	0.003	0.010	α >0.2	35	0.045	−0.275	0.05< α <0.1	18	0.122	0.114	α >0.2
11139.1783	31	−0.017	−0.092	α >0.2	31	0.034	−0.177	α >0.2	24	−0.281	−0.280	0.1< α <0.2
11208.6983	26	−0.076	−0.239	α >0.2	26	−0.090	−0.239	α >0.2	26	−0.427	−0.399	0.05< α <0.1
11508.3168	47	−0.080	−0.377	α <0.05	47	−0.180	−0.377	α <0.05	47	−0.063	−0.039	α >0.2
11597.1787	11	−0.074	−0.258	α >0.2	11	−0.232	−0.510	0.1< α <0.2	10	0.564	0.376	α >0.2
11844.3396	39	−0.064	−0.285	α <0.05	39	−0.107	−0.285	α <0.05	39	−0.253	−0.222	0.05< α <0.1
11913.5580	29	−0.011	−0.066	α >0.2	29	−0.180	−0.066	α >0.2	29	−0.138	−0.073	α >0.2
12205.2265	31	−0.046	−0.217	α >0.2	31	0.050	−0.271	0.1< α <0.2	30	−0.409	−0.336	0.05< α <0.1
12267.7582	6	0.005	0.075	α >0.2	6	−0.290	0.075	α >0.2	6	1.200	0.219	α >0.2
12572.3722	21	−0.155	−0.319	α >0.2	21	−0.286	−0.319	α >0.2	21	−0.403	−0.304	α >0.2
12985.2822	14	0.210	0.689	α <0.05	14	−0.461	0.689	α <0.05	14	−1.693	−0.725	α <0.05
13313.3627	28	−0.103	−0.362	0.05< α <0.1	28	−0.098	−0.362	0.05< α <0.1	28	0.471	0.262	0.1< α <0.2
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7136.7267	13	0.283	0.749	α <0.05	13	0.121	0.749	α <0.05	13	−0.104	−0.059	α >0.2
7879.2407	10	0.251	0.889	α <0.05	10	0.189	0.889	α <0.05	10	0.337	0.247	α >0.2
8199.4179	20	0.013	0.053	α >0.2	20	0.138	0.076	α >0.2	19	0.366	0.175	α >0.2
8297.1721	15	−0.367	−0.520	0.05< α <0.1	15	0.884	−0.526	0.05< α <0.1	13	−0.994	−0.494	0.1< α <0.2
8555.3957	17	−0.038	−0.162	α >0.2	—	—	—	—	—	—	—	—
8652.1660	15	0.058	0.070	α >0.2	15	0.521	−0.492	0.1< α <0.2	8	−0.297	−0.157	α >0.2
8914.3953	11	0.115	0.605	0.05< α <0.1	11	−0.173	0.709	α <0.05	8	−0.475	−0.259	α >0.2
9000.7026	23	−0.019	−0.047	α >0.2	23	0.123	0.047	α >0.2	20	−0.160	−0.076	α >0.2
9264.9693	14	0.123	0.521	0.1< α <0.2	14	0.189	0.519	0.1< α <0.2	13	−0.145	−0.072	α >0.2
9312.1507	60	0.125	0.292	α <0.05	60	0.157	0.283	α <0.05	59	0.123	0.111	0.05< α <0.1
9372.9993	22	0.217	0.772	α <0.05	22	0.041	0.742	α <0.05	17	0.132	0.095	α >0.2
9697.4391	11	−0.058	−0.133	α >0.2	11	0.166	−0.133	α >0.2	11	−0.132	−0.085	α >0.2
10030.8714	40	0.133	0.209	0.05< α <0.1	40	0.466	0.081	α >0.2	29	−0.078	−0.046	α >0.2
10105.7079	22	0.241	0.497	α <0.05	22	0.214	0.497	α <0.05	22	0.429	0.430	0.05< α <0.1
10412.9168	26	0.256	0.492	α <0.05	26	0.181	0.630	α <0.05	23	−0.010	−0.007	α >0.2
10452.8004	16	0.005	0.010	α >0.2	16	−0.006	0.173	α >0.2	13	−0.252	−0.160	α >0.2
10495.6924	24	0.139	0.203	α >0.2	24	0.423	0.354	0.1< α <0.2	22	−0.121	−0.075	α >0.2
10730.9104	24	0.193	0.196	α >0.2	24	0.571	0.167	α >0.2	23	−0.494	−0.242	α >0.2
10766.8512	40	0.079	0.126	α >0.2	40	0.300	0.180	0.1< α <0.2	38	−0.199	−0.103	α >0.2
10832.5480	26	−0.122	−0.212	α >0.2	26	0.257	−0.228	α >0.2	25	1.471	0.487	α <0.05
11092.9196	15	0.305	0.587	α <0.05	15	0.182	0.587	α <0.05	15	0.053	0.063	α >0.2
11133.9106	20	0.132	0.295	α >0.2	20	0.037	0.317	α >0.2	18	−0.069	−0.035	α >0.2
11193.7414	8	0.342	0.844	α <0.05	8	−0.048	0.844	α <0.05	8	−0.191	−0.163	α >0.2
11222.2019	11	0.103	0.158	α >0.2	11	0.210	0.158	α >0.2	11	0.173	0.177	α >0.2
11477.7198	24	0.072	0.119	α >0.2	24	−0.529	0.099	α >0.2	22	−0.887	−0.290	α >0.2
11556.5769	20	0.009	0.015	α >0.2	20	0.314	−0.086	α >0.2	18	−0.799	−0.515	α <0.05
11604.1726	12	0.056	0.050	α >0.2	12	0.311	0.071	α >0.2	11	−0.589	−0.602	0.05< α <0.1
11878.7729	23	0.358	0.547	α <0.05	23	−0.044	0.602	α <0.05	21	−0.629	−0.345	0.1< α <0.2
11949.4890	17	0.050	0.067	α >0.2	17	0.529	0.067	α >0.2	17	−0.448	−0.166	α >0.2

Table 5 (cont'd)

HJD_{mean}	N_V	b_{bv}	r_{bv}	α	N_{BV}	b_{ub}	r_{ub}	α	N_{UBV}	b_{ubv}	r_{ubv}	α
12207.0234	40	0.024	0.064	α >0.2	40	0.014	0.064	α >0.2	40	−0.187	−0.058	α >0.2
12269.7699	13	0.123	0.447	α >0.2	13	−0.140	0.463	0.1< α <0.2	11	−0.938	−0.550	0.05< α <0.1
12322.6590	13	0.296	0.423	α >0.2	13	0.253	0.406	α >0.2	12	0.659	0.500	0.1< α <0.2
12555.8647	14	0.095	0.291	α >0.2	14	0.306	0.586	0.05< α <0.1	12	1.482	0.781	α <0.05
12619.2532	22	−0.072	−0.213	α >0.2	22	0.282	−0.213	α >0.2	22	−0.769	−0.388	0.1< α <0.2
12668.1252	21	0.159	0.337	α >0.2	21	−0.117	0.373	0.1< α <0.2	18	0.019	0.013	α >0.2
12913.9239	28	−0.258	−0.334	0.05< α <0.1	28	−0.348	−0.308	0.1< α <0.2	23	0.096	0.058	α >0.2
12953.3919	33	−0.276	−0.507	α <0.05	33	0.217	−0.504	α <0.05	31	−0.463	−0.322	0.05< α <0.1
12990.7501	22	−0.188	−0.258	α >0.2	22	−0.101	−0.277	α >0.2	20	−0.436	−0.233	α >0.2
13028.1535	17	0.025	0.064	α >0.2	17	−0.116	−0.251	α >0.2	16	0.381	0.276	α >0.2
13067.6090	8	−0.322	−0.522	α >0.2	8	−0.084	−0.666	0.05< α <0.1	7	−0.107	−0.169	α >0.2
13284.3716	32	0.105	0.425	α <0.05	32	0.153	0.435	α <0.05	25	−0.146	−0.064	α >0.2
13328.8123	30	0.095	0.387	α <0.05	30	0.121	0.410	α <0.05	26	0.418	0.290	0.1< α <0.2
13398.6507	42	0.091	0.239	0.05< α <0.1	42	0.182	0.244	α <0.05	39	0.055	0.039	α >0.2
					V1149 Ori							
7572.1466	12	−0.001	−0.007	α >0.2	12	0.136	−0.006	α >0.2	11	−0.405	−0.316	α >0.2
8229.8751	19	0.185	0.696	α <0.05	19	0.127	0.712	α <0.05	18	0.212	0.181	α >0.2
8312.1835	14	0.072	0.292	α >0.2	14	0.489	0.292	α >0.2	14	1.346	0.480	0.1< α <0.2
8571.9597	22	0.075	0.526	0.1< α <0.2	—	—	—	—	—	—	—	—
8654.7577	9	0.201	0.333	α >0.2	9	0.488	0.245	α >0.2	8	−0.343	−0.228	α >0.2
8915.4620	19	0.053	0.524	α <0.05	19	−0.024	0.607	α <0.05	17	−0.223	−0.166	α >0.2
8991.1227	31	0.062	0.320	0.05< α <0.1	31	0.158	0.320	0.05< α <0.1	31	−0.366	−0.179	α >0.2
9292.9221	26	0.051	0.287	0.1< α <0.2	26	0.141	0.287	0.1< α <0.2	26	0.393	0.173	α >0.2
9376.0888	20	0.163	0.595	α <0.05	20	0.113	0.595	α <0.05	20	−0.019	−0.012	α >0.2
9428.6472	9	0.084	0.711	α <0.05	9	−0.095	0.693	α <0.05	8	0.221	0.107	α >0.2
9714.4868	15	0.063	0.251	α >0.2	15	−0.077	0.294	α >0.2	14	1.294	0.460	0.1< α <0.2
10019.4179	40	0.095	0.225	0.05< α <0.1	40	0.162	0.295	α <0.05	26	−0.343	−0.267	α <0.05
10068.7104	39	0.067	0.282	α <0.05	39	0.064	0.419	α <0.05	28	0.293	0.240	0.05< α <0.1
10133.6861	32	0.137	0.473	α <0.05	32	0.103	0.473	α <0.05	32	0.382	0.489	α <0.05
10421.4340	66	0.138	0.711	α <0.05	66	0.080	0.734	α <0.05	62	0.197	0.157	α <0.05
10500.5645	38	0.141	0.755	α <0.05	38	0.166	0.750	α <0.05	34	0.542	0.414	α <0.05
10762.9282	47	0.158	0.832	α <0.05	47	0.125	0.853	α <0.05	43	0.628	0.603	α <0.05
10868.0884	44	0.142	0.682	α <0.05	44	0.162	0.716	α <0.05	32	0.579	0.451	α <0.05
11103.4215	21	0.140	0.783	α <0.05	21	0.127	0.827	α <0.05	20	0.443	0.360	0.1< α <0.2
11172.4096	29	0.147	0.658	α <0.05	29	0.119	0.745	α <0.05	28	0.358	0.303	0.1< α <0.2
11247.2231	21	0.188	0.648	α <0.05	21	0.230	0.614	α <0.05	15	0.368	0.266	α >0.2
11493.4291	46	0.084	0.396	α <0.05	46	0.061	0.395	α <0.05	43	−0.172	−0.156	0.1< α <0.2
11590.7590	28	0.106	0.396	α <0.05	28	0.121	0.363	0.05< α <0.1	27	−0.042	−0.035	α >0.2
11830.8130	22	0.132	0.683	α <0.05	22	0.134	0.674	α <0.05	21	0.087	0.055	α >0.2
11920.5772	57	0.086	0.512	α <0.05	57	0.169	0.537	α <0.05	52	0.651	0.363	α <0.05
11975.6794	18	0.120	0.456	0.1< α <0.2	18	0.260	0.456	0.1< α <0.2	18	0.561	0.376	α >0.2
12219.2798	21	0.149	0.376	0.1< α <0.2	21	0.281	0.376	0.1< α <0.2	21	1.020	0.488	α <0.05
12284.2940	25	0.159	0.633	α <0.05	25	0.383	0.633	α <0.05	25	1.499	0.722	α <0.05
12335.1703	28	0.208	0.637	α <0.05	28	0.290	0.592	α <0.05	26	0.846	0.526	α <0.05
12566.9248	43	0.120	0.489	α <0.05	43	0.257	0.445	α <0.05	39	−0.061	−0.034	α >0.2
12633.2222	51	0.201	0.767	α <0.05	51	0.305	0.767	α <0.05	51	0.876	0.606	α <0.05
12700.6491	35	0.087	0.300	0.05< α <0.1	35	0.207	0.632	α <0.05	34	0.302	0.234	0.1< α <0.2
12953.3668	115	0.142	0.812	α <0.05	115	0.113	0.807	α <0.05	112	0.573	0.472	0.1< α <0.2
13054.1853	44	0.159	0.717	α <0.05	44	0.060	0.703	α <0.05	42	0.276	0.314	α <0.05
13358.7765	120	0.139	0.740	α <0.05	120	0.149	0.745	α <0.05	116	0.602	0.453	α >0.2
					DH Leo							
9095.8200	21	−0.154	−0.264	α >0.2	21	0.262	−0.264	α >0.2	21	−0.294	−0.194	α >0.2
9777.9624	18	0.086	0.218	α >0.2	18	0.236	0.218	α >0.2	18	−0.074	−0.051	α >0.2
10501.5779	9	−1.363	−0.597	0.1< α <0.2	9	0.276	−0.597	0.1< α <0.2	9	−0.422	−0.664	0.05< α <0.1
10560.3633	9	0.562	0.550	0.1< α <0.2	9	−0.236	0.550	0.1< α <0.2	9	−0.043	−0.060	α >0.2
10585.3282	12	−0.036	−0.202	α >0.2	12	0.107	−0.202	α >0.2	12	−0.292	−0.122	α >0.2
10829.1519	10	0.097	0.243	α >0.2	10	0.212	0.243	α >0.2	10	−0.184	−0.186	α >0.2
10939.8486	8	0.077	0.113	α >0.2	8	0.076	0.113	α >0.2	8	0.037	0.054	α >0.2
11128.6391	6	−0.094	−0.192	α >0.2	6	−0.262	−0.192	α >0.2	6	0.064	0.044	α >0.2

Table 5 (cont'd)

HJD_{mean}	N_V	b_{bv}	r_{bv}	α	N_{BV}	b_{ub}	r_{ub}	α	N_{UBV}	b_{ubv}	r_{ubv}	α
11206.5078	10	0.252	0.555	$0.1< \alpha <0.2$	10	0.385	0.555	$0.1< \alpha <0.2$	10	1.156	0.528	$0.1< \alpha <0.2$
11580.0273	5	−1.222	−0.386	$\alpha >0.2$	—	—	—	—	—	—	—	—
11632.8647	8	−0.159	−0.494	$\alpha >0.2$	8	0.452	−0.494	$\alpha >0.2$	8	−0.685	−0.334	$\alpha >0.2$
11657.8698	26	−0.084	−0.238	$\alpha >0.2$	26	0.316	−0.238	$\alpha >0.2$	26	0.019	0.011	$\alpha >0.2$
11949.6177	42	−0.055	−0.090	$\alpha >0.2$	42	−0.041	−0.090	$\alpha >0.2$	42	−0.069	−0.051	$\alpha >0.2$
HU Vir												
7571.8097	23	0.076	0.558	$\alpha <0.05$	23	0.016	0.474	$\alpha <0.05$	22	0.223	0.247	$\alpha >0.2$
7955.7009	13	0.166	0.874	$\alpha <0.05$	13	0.113	0.874	$\alpha <0.05$	13	0.391	0.430	$\alpha >0.2$
8299.8779	22	0.120	0.791	$\alpha <0.05$	22	0.238	0.837	$\alpha <0.05$	12	1.184	0.468	$0.05< \alpha <0.1$
8339.6997	18	0.134	0.954	$\alpha <0.05$	18	0.195	0.952	$\alpha <0.05$	17	1.339	0.775	$\alpha <0.05$
8379.1931	28	0.170	0.780	$\alpha <0.05$	28	0.142	0.796	$\alpha <0.05$	20	0.534	0.449	$\alpha <0.05$
8638.4762	44	0.087	0.343	$\alpha <0.05$	44	0.605	0.605	$\alpha <0.05$	11	1.825	0.512	$\alpha <0.05$
8702.7456	42	0.052	0.175	$0.1< \alpha <0.2$	42	0.270	0.469	$\alpha <0.05$	12	−0.054	−0.033	$\alpha >0.2$
8765.6532	53	0.093	0.404	$\alpha <0.05$	53	0.227	0.090	$0.1< \alpha <0.2$	19	0.579	0.227	$\alpha <0.05$
8999.4867	59	0.081	0.307	$\alpha <0.05$	59	0.115	0.371	$\alpha <0.05$	24	−0.043	−0.013	$\alpha >0.2$
9079.7925	95	0.082	0.324	$\alpha <0.05$	95	0.060	0.301	$\alpha <0.05$	37	0.876	0.250	$0.05< \alpha <0.1$
9137.1486	40	0.121	0.446	$\alpha <0.05$	—	—	—	—	—	—	—	—
9360.4744	67	0.125	0.325	$\alpha <0.05$	67	0.513	0.427	$\alpha <0.05$	32	0.624	0.201	$\alpha <0.05$
9431.8069	101	0.051	0.137	$\alpha >0.2$	101	0.416	0.149	$\alpha >0.2$	44	−0.645	−0.213	$\alpha >0.2$
9497.6616	21	−0.006	−0.012	$\alpha >0.2$	21	0.907	0.291	$\alpha >0.2$	6	-2.074	−0.217	$\alpha >0.2$
9739.2936	12	0.151	0.860	$\alpha <0.05$	12	0.217	0.853	$\alpha <0.05$	11	0.571	0.363	$\alpha >0.2$
9885.6510	10	−0.036	−0.173	$\alpha >0.2$	—	—	—	—	—	—	—	—
10124.4139	62	0.074	0.447	$\alpha <0.05$	62	0.127	0.437	$\alpha <0.05$	43	0.578	0.254	$\alpha <0.05$
10202.1810	24	0.028	0.126	$\alpha >0.2$	24	−0.118	−0.042	$\alpha >0.2$	14	0.444	0.239	$\alpha >0.2$
10236.2116	19	0.028	0.111	$\alpha >0.2$	19	0.181	0.359	$\alpha >0.2$	5	0.198	0.048	$\alpha >0.2$
10423.4667	17	0.024	0.093	$\alpha >0.2$	17	0.018	0.353	$\alpha >0.2$	9	−0.008	−0.012	$\alpha >0.2$
10483.7131	30	0.074	0.212	$\alpha >0.2$	30	0.182	0.193	$\alpha >0.2$	22	0.246	0.109	$\alpha >0.2$
10525.3309	45	0.136	0.330	$\alpha <0.05$	45	0.155	0.250	$\alpha <0.05$	33	−0.049	−0.048	$\alpha >0.2$
10566.6972	32	0.145	0.379	$\alpha <0.05$	32	0.014	0.133	$\alpha >0.2$	20	0.078	0.102	$\alpha >0.2$
10606.6587	20	0.116	0.655	$\alpha <0.05$	20	0.044	0.964	$\alpha <0.05$	6	0.489	0.254	$\alpha >0.2$
10789.0346	25	0.099	0.618	$\alpha <0.05$	25	−0.016	0.431	$\alpha <0.05$	11	−0.764	−0.552	$\alpha <0.05$
10856.3146	63	0.116	0.721	$\alpha <0.05$	63	0.126	0.710	$\alpha <0.05$	34	0.814	0.541	$\alpha <0.05$
10919.2175	40	0.106	0.772	$\alpha <0.05$	40	0.053	0.715	$\alpha <0.05$	26	0.424	0.375	$\alpha <0.05$
10965.6732	34	0.090	0.661	$\alpha <0.05$	34	0.122	0.615	$\alpha <0.05$	19	0.452	0.315	$0.05< \alpha <0.1$
11155.4593	22	0.089	0.340	$0.1< \alpha <0.2$	22	0.047	0.501	$\alpha <0.05$	9	0.046	0.037	$\alpha >0.2$
11199.3651	33	0.093	0.403	$\alpha <0.05$	33	0.027	0.588	$\alpha <0.05$	18	0.664	0.395	$\alpha <0.05$
11254.8398	40	0.009	0.047	$\alpha >0.2$	40	−0.054	0.022	$\alpha >0.2$	27	0.038	0.021	$\alpha >0.2$
11324.1729	51	−0.009	−0.030	$\alpha >0.2$	51	−0.173	0.052	$\alpha >0.2$	21	0.909	0.377	$\alpha <0.05$
11519.0287	15	0.168	0.688	$\alpha <0.05$	15	0.095	0.632	$\alpha <0.05$	6	−0.699	−0.193	$\alpha >0.2$
11557.4346	31	0.130	0.373	$\alpha <0.05$	31	−0.011	0.450	$\alpha <0.05$	18	0.111	0.103	$\alpha >0.2$
11593.8636	17	0.086	0.548	$0.05< \alpha <0.1$	17	0.126	0.443	$0.1< \alpha <0.2$	7	−0.206	−0.088	$\alpha >0.2$
11633.2384	39	0.068	0.424	$\alpha <0.05$	39	0.081	0.446	$\alpha <0.05$	22	0.315	0.144	$\alpha >0.2$
11689.1852	25	0.139	0.810	$\alpha <0.05$	25	0.091	0.837	$\alpha <0.05$	13	0.526	0.432	$\alpha <0.05$
11899.0089	44	0.102	0.685	$\alpha <0.05$	44	0.097	0.763	$\alpha <0.05$	18	0.473	0.424	$\alpha <0.05$
11970.3221	50	0.111	0.748	$\alpha <0.05$	50	0.129	0.791	$\alpha <0.05$	25	0.811	0.436	$\alpha <0.05$
12020.2705	33	0.114	0.744	$\alpha <0.05$	33	0.181	0.825	$\alpha <0.05$	16	0.943	0.614	$\alpha <0.05$
12060.6745	28	0.148	0.666	$\alpha <0.05$	28	−0.030	0.883	$\alpha <0.05$	14	−0.355	−0.298	$0.1< \alpha <0.2$
12289.9104	76	0.101	0.686	$\alpha <0.05$	76	0.101	0.679	$\alpha <0.05$	38	0.490	0.379	$\alpha <0.05$
12359.2491	68	0.102	0.698	$\alpha <0.05$	68	0.203	0.770	$\alpha <0.05$	42	1.139	0.536	$\alpha <0.05$
12413.6945	53	0.102	0.634	$\alpha <0.05$	53	0.129	0.677	$\alpha <0.05$	32	0.392	0.246	$\alpha <0.05$
12617.4607	28	0.109	0.591	$\alpha <0.05$	28	0.354	0.645	$\alpha <0.05$	14	0.700	0.262	$0.1< \alpha <0.2$
12678.8500	56	0.082	0.394	$\alpha <0.05$	56	0.184	0.404	$\alpha <0.05$	32	0.620	0.327	$\alpha <0.05$
12737.2522	38	0.089	0.363	$\alpha <0.05$	38	0.217	0.346	$\alpha <0.05$	22	0.379	0.252	$0.05< \alpha <0.1$
12791.6576	35	0.105	0.477	$\alpha <0.05$	35	−0.094	0.282	$0.05< \alpha <0.1$	11	−1.076	−0.733	$\alpha <0.05$
12992.4434	50	0.101	0.405	$\alpha <0.05$	50	0.328	0.470	$\alpha <0.05$	27	0.913	0.369	$\alpha <0.05$
13062.2891	44	0.031	0.107	$\alpha >0.2$	44	0.329	0.136	$0.1< \alpha <0.2$	20	−0.138	−0.067	$\alpha >0.2$
13390.9240	43	−0.088	−0.177	$0.1< \alpha <0.2$	43	0.231	−0.295	$\alpha <0.05$	14	0.407	0.368	$\alpha <0.05$
13390.9240	43	−0.088	−0.177	$0.1< \alpha <0.2$	43	0.231	−0.295	$\alpha <0.05$	14	0.407	0.368	$\alpha <0.05$
RS CVn												

Table 5 (cont'd)

HJD$_{\mathrm{mean}}$	N$_V$	b$_{bv}$	r$_{bv}$	α	N$_{BV}$	b$_{ub}$	r$_{ub}$	α	N$_{UBV}$	b$_{ubv}$	r$_{ubv}$	α
17976.3401	38	−0.409	−0.690	$\alpha <0.05$	38	−0.130	−0.693	$\alpha <0.05$	23	0.129	0.084	$\alpha >0.2$
18343.3382	51	−0.179	−0.394	$\alpha <0.05$	51	−0.101	−0.394	$\alpha <0.05$	50	−0.150	−0.128	$0.1< \alpha <0.2$
18692.4145	30	−0.276	−0.541	$\alpha <0.05$	30	0.016	−0.571	$\alpha <0.05$	26	−0.178	−0.132	$\alpha >0.2$
19073.2157	70	−0.256	−0.432	$\alpha <0.05$	70	−0.376	−0.438	$\alpha <0.05$	66	0.146	0.086	$0.1< \alpha <0.2$
19438.8448	63	−0.298	−0.523	$\alpha <0.05$	63	−0.089	−0.607	$\alpha <0.05$	60	−0.055	−0.044	$\alpha >0.2$
19837.5291	46	−0.197	−0.310	$\alpha <0.05$	46	−0.112	−0.282	$\alpha <0.05$	45	−0.033	−0.042	$\alpha >0.2$
20153.8389	8	−0.186	−0.630	$0.1< \alpha <0.2$	8	−0.321	−0.630	$0.1< \alpha <0.2$	8	−0.369	−0.192	$\alpha >0.2$
20462.4014	49	−0.219	−0.744	$\alpha <0.05$	49	−0.241	−0.747	$\alpha <0.05$	46	0.605	0.466	$\alpha <0.05$
20578.7255	68	−0.278	−0.617	$\alpha <0.05$	68	−0.234	−0.613	$\alpha <0.05$	67	0.090	0.075	$0.1< \alpha <0.2$
20884.8603	113	−0.232	−0.528	$\alpha <0.05$	113	−0.203	−0.531	$\alpha <0.05$	110	0.047	0.036	$\alpha >0.2$
21183.7486	47	−0.179	−0.753	$\alpha <0.05$	47	−0.240	−0.750	$\alpha <0.05$	46	0.426	0.284	$\alpha <0.05$
21304.6098	66	−0.224	−0.601	$\alpha <0.05$	66	−0.189	−0.606	$\alpha <0.05$	65	0.079	0.057	$0.1< \alpha <0.2$
21558.9568	40	−0.175	−0.434	$\alpha <0.05$	40	−0.180	−0.450	$\alpha <0.05$	37	0.205	0.187	$0.1< \alpha <0.2$
21670.5186	52	−0.190	−0.589	$\alpha <0.05$	52	−0.125	−0.582	$\alpha <0.05$	51	−0.181	−0.163	$0.05< \alpha <0.1$
22061.5362	67	−0.141	−0.551	$\alpha <0.05$	67	−0.181	−0.544	$\alpha <0.05$	66	0.442	0.268	$\alpha <0.05$
22381.8404	59	−0.199	−0.788	$\alpha <0.05$	59	−0.124	−0.795	$\alpha <0.05$	56	0.131	0.087	$0.1< \alpha <0.2$
22718.3329	71	−0.201	−0.694	$\alpha <0.05$	71	−0.263	−0.685	$\alpha <0.05$	68	0.441	0.291	$\alpha <0.05$
23033.9564	27	−0.227	−0.787	$\alpha <0.05$	27	−0.184	−0.794	$\alpha <0.05$	26	0.362	0.347	$0.05< \alpha <0.1$
23282.2225	54	−0.221	−0.747	$\alpha <0.05$	54	−0.209	−0.754	$\alpha <0.05$	53	0.316	0.253	$\alpha <0.05$
						V775 Her						
8039.3985	6	−0.092	−0.284	$\alpha <0.05$	—	—	—	—	—	—	—	—
8192.6168	18	0.208	0.442	$\alpha <0.05$	—	—	—	—	—	—	—	—
8365.9717	10	0.372	0.782	$\alpha <0.05$	—	—	—	—	—	—	—	—
8409.4401	20	0.259	0.568	$\alpha <0.05$	20	−0.007	0.706	$\alpha <0.05$	10	−0.166	−0.161	$\alpha >0.2$
8549.1283	17	0.145	0.385	$0.1< \alpha <0.2$	—	—	—	—	—	—	—	—
8749.3950	24	0.028	0.185	$\alpha >0.2$	24	0.049	−0.045	$\alpha >0.2$	7	−1.179	−0.561	$\alpha <0.05$
8795.9250	19	0.077	0.210	$\alpha >0.2$	19	−0.370	0.464	$0.05< \alpha <0.1$	7	−0.363	−0.348	$\alpha >0.2$
8929.0966	15	0.044	0.103	$\alpha >0.2$	15	−0.381	0.035	$\alpha >0.2$	7	0.264	0.113	$\alpha >0.2$
9106.4502	9	−0.235	−0.539	$0.05< \alpha <0.1$	—	—	—	—	—	—	—	—
9161.8643	27	0.086	0.374	$\alpha >0.2$	—	—	—	—	—	—	—	—
9360.5367	18	0.292	0.669	$\alpha <0.05$	18	0.212	0.808	$\alpha <0.05$	12	0.780	0.501	$0.05< \alpha <0.1$
9534.5659	22	0.168	0.177	$\alpha >0.2$	22	0.219	0.016	$\alpha >0.2$	12	0.358	0.210	$\alpha >0.2$
9881.7198	27	0.131	0.314	$0.1< \alpha <0.2$	27	−0.373	0.117	$\alpha >0.2$	16	−1.067	−0.392	$0.05< \alpha <0.1$
10006.5978	24	0.278	0.430	$0.05< \alpha <0.1$	24	0.110	0.372	$0.1< \alpha <0.2$	11	0.610	0.259	$\alpha >0.2$
10257.7019	20	−0.061	−0.081	$\alpha >0.2$	20	0.692	−0.230	$\alpha >0.2$	15	−0.663	−0.491	$0.05< \alpha <0.1$
10512.4971	18	0.075	0.220	$\alpha >0.2$	18	0.549	0.501	$0.05< \alpha <0.1$	10	1.309	0.454	$0.1< \alpha <0.2$
10556.4291	33	0.260	0.350	$\alpha <0.05$	33	0.199	0.605	$\alpha <0.05$	15	−0.148	−0.097	$\alpha >0.2$
10599.8688	15	0.168	0.269	$\alpha >0.2$	15	0.331	0.814	$\alpha <0.05$	9	0.360	0.139	$\alpha >0.2$
10620.3764	31	0.025	0.087	$\alpha >0.2$	31	−0.116	−0.082	$\alpha >0.2$	15	0.048	0.025	$\alpha >0.2$
10667.0063	14	−0.207	−0.360	$\alpha >0.2$	14	0.115	−0.374	$\alpha >0.2$	12	−0.095	−0.069	$\alpha >0.2$
10726.4661	22	0.001	0.002	$\alpha >0.2$	22	−0.062	0.136	$\alpha >0.2$	15	1.633	0.447	$0.05< \alpha <0.1$
10766.5903	11	0.242	0.516	$0.1< \alpha <0.2$	11	0.208	0.483	$\alpha >0.2$	9	−0.728	−0.503	$0.1< \alpha <0.2$
10877.4989	15	0.172	0.180	$\alpha >0.2$	15	1.281	0.275	$\alpha >0.2$	8	0.639	0.150	$\alpha >0.2$
10914.9025	19	0.027	0.124	$\alpha >0.2$	19	0.446	−0.045	$\alpha >0.2$	9	0.596	0.160	$\alpha >0.2$
10943.9058	13	0.130	0.425	$0.1< \alpha <0.2$	—	—	—	—	—	—	—	—
11037.5137	30	0.028	0.068	$\alpha >0.2$	30	−0.033	−0.023	$\alpha >0.2$	19	0.222	0.150	$\alpha >0.2$
11129.1022	20	0.232	0.728	$\alpha <0.05$	20	0.156	0.735	$\alpha <0.05$	13	0.694	0.342	$\alpha >0.2$
11237.0388	6	0.106	0.435	$0.1< \alpha <0.2$	—	—	—	—	—	—	—	—
11277.4115	21	0.125	0.347	$0.1< \alpha <0.2$	21	0.460	0.672	$\alpha <0.05$	14	0.736	0.179	$\alpha >0.2$
11316.3724	23	0.115	0.324	$0.1< \alpha <0.2$	23	0.354	0.141	$\alpha >0.2$	12	0.045	0.016	$\alpha >0.2$
11348.8967	18	0.100	0.341	$\alpha >0.2$	18	0.124	0.166	$\alpha >0.2$	12	−0.401	−0.193	$\alpha >0.2$
11461.1468	26	0.198	0.394	$0.05< \alpha <0.1$	26	0.403	0.488	$\alpha <0.05$	18	0.524	0.309	$0.1< \alpha <0.2$
11491.1103	24	0.294	0.501	$\alpha <0.05$	24	0.479	0.213	$\alpha >0.2$	11	0.344	0.100	$\alpha >0.2$
11613.4823	12	0.096	0.566	$0.05< \alpha <0.1$	12	0.184	0.629	$0.05< \alpha <0.1$	9	−0.686	−0.237	$\alpha >0.2$
11647.9043	27	0.132	0.705	$\alpha <0.05$	27	−0.009	0.637	$\alpha <0.05$	17	−0.035	−0.012	$\alpha >0.2$
11684.3448	18	0.125	0.409	$0.1< \alpha <0.2$	18	0.086	0.629	$\alpha <0.05$	10	0.169	0.078	$\alpha >0.2$
11726.2243	20	0.011	0.019	$\alpha >0.2$	20	0.309	−0.051	$\alpha >0.2$	16	0.289	0.172	$\alpha >0.2$
11839.1050	25	0.188	0.767	$\alpha <0.05$	25	0.338	0.899	$\alpha <0.05$	11	1.229	0.590	$\alpha <0.05$
11983.0143	19	0.214	0.553	$\alpha <0.05$	19	−0.579	0.929	$\alpha <0.05$	9	−1.652	−0.490	$0.05< \alpha <0.1$

Table 5 (cont'd)

HJD_{mean}	N_V	b_{bv}	r_{bv}	α	N_{BV}	b_{ub}	r_{ub}	α	N_{UBV}	b_{ubv}	r_{ubv}	α
12062.2088	40	0.114	0.374	$\alpha <0.05$	40	0.543	0.363	$\alpha <0.05$	20	−0.005	−0.002	$\alpha >0.2$
12184.0060	20	−0.099	−0.243	$\alpha >0.2$	20	0.190	0.314	$\alpha >0.2$	16	−0.183	−0.066	$\alpha >0.2$
12214.6219	13	0.265	0.652	$\alpha <0.05$	13	0.083	0.612	$0.05< \alpha <0.1$	6	−0.294	−0.188	$\alpha >0.2$
12345.4859	15	0.041	0.123	$\alpha >0.2$	15	−0.038	0.537	$0.05< \alpha <0.1$	10	-2.000	−0.654	$\alpha <0.05$
12373.9106	10	0.144	0.531	$0.1< \alpha <0.2$	10	0.100	0.505	$0.1< \alpha <0.2$	8	0.455	0.330	$\alpha >0.2$
12427.3858	38	0.200	0.274	$0.05< \alpha <0.1$	38	0.083	0.275	$0.05< \alpha <0.1$	31	−0.087	−0.039	$\alpha >0.2$
12570.6510	21	0.064	0.286	$\alpha >0.2$	21	−0.010	0.527	$\alpha <0.05$	12	0.049	0.017	$\alpha >0.2$
12714.9820	15	0.026	0.100	$\alpha >0.2$	15	−0.157	0.102	$\alpha >0.2$	12	1.314	0.460	$0.1< \alpha <0.2$
12796.9654	11	0.165	0.767	$\alpha <0.05$	—	—	—	—	—	—	—	—
12913.6600	20	0.115	0.276	$\alpha >0.2$	20	0.373	0.642	$\alpha <0.05$	12	0.350	0.075	$\alpha >0.2$
12949.6025	20	0.082	0.203	$\alpha >0.2$	20	0.080	0.221	$\alpha >0.2$	12	1.063	0.497	$0.05< \alpha <0.1$
13075.4811	10	0.062	0.202	$\alpha >0.2$	10	0.062	0.495	$\alpha >0.2$	5	0.300	0.165	$\alpha >0.2$
13120.8559	18	0.072	0.195	$\alpha >0.2$	18	0.011	0.311	$\alpha >0.2$	11	1.041	0.548	$\alpha <0.05$
13170.3721	12	0.004	0.009	$\alpha >0.2$	12	0.924	−0.112	$\alpha >0.2$	7	−1.197	−0.523	$0.1< \alpha <0.2$
13341.8507	29	0.360	0.794	$\alpha <0.05$	29	0.512	0.794	$\alpha <0.05$	12	0.466	0.122	$\alpha >0.2$
AR Lac												
17982.7438	7	0.064	0.052	$\alpha >0.2$	—	—	—	—	—	—	—	—
18206.2227	16	0.053	0.103	$\alpha >0.2$	16	0.168	0.143	$\alpha >0.2$	15	−0.711	−0.407	$\alpha >0.2$
18517.7649	21	−0.051	−0.143	$\alpha >0.2$	21	−0.125	0.578	$\alpha <0.05$	6	-2.258	−0.732	$\alpha <0.05$
18866.7892	55	−0.126	−0.232	$\alpha <0.05$	55	−0.330	−0.288	$\alpha <0.05$	51	0.472	0.330	$\alpha <0.05$
19247.5690	65	−0.274	−0.361	$\alpha <0.05$	65	0.061	−0.463	$\alpha <0.05$	60	−0.433	−0.358	$\alpha <0.05$
19590.1589	29	−0.581	−0.669	$\alpha <0.05$	29	0.021	−0.625	$\alpha <0.05$	27	−0.239	−0.361	$0.05< \alpha <0.1$
19924.6312	35	−0.472	−0.727	$\alpha <0.05$	35	−0.264	−0.730	$\alpha <0.05$	34	0.382	0.520	$\alpha <0.05$
20036.1966	38	0.018	0.052	$\alpha >0.2$	38	−0.205	−0.065	$\alpha >0.2$	29	0.131	0.069	$\alpha >0.2$
20354.0240	34	−0.544	−0.625	$\alpha <0.05$	34	0.276	−0.618	$\alpha <0.05$	32	−0.605	−0.646	$\alpha <0.05$
20596.4258	36	−0.249	−0.414	$\alpha <0.05$	36	−0.076	−0.386	$\alpha <0.05$	33	0.739	0.494	$\alpha <0.05$
20663.0217	15	−0.213	−0.164	$\alpha >0.2$	—	—	—	—	—	—	—	—
20755.7910	34	0.064	0.087	$\alpha >0.2$	34	0.046	0.140	$\alpha >0.2$	31	−0.069	−0.029	$\alpha >0.2$
20961.4429	22	0.021	0.088	$\alpha >0.2$	22	−0.495	0.081	$\alpha >0.2$	21	1.210	0.346	$0.1< \alpha <0.2$
21133.1901	30	−0.003	−0.006	$\alpha >0.2$	30	0.098	−0.023	$\alpha >0.2$	28	−0.933	−0.438	$\alpha <0.05$
21342.2629	27	−0.363	−0.318	$0.1< \alpha <0.2$	27	0.080	−0.409	$\alpha <0.05$	26	−0.440	−0.418	$\alpha <0.05$
21476.1016	24	−0.128	−0.201	$\alpha >0.2$	24	0.503	−0.263	$\alpha >0.2$	22	−0.150	−0.111	$\alpha >0.2$
21709.3057	10	−0.110	−0.119	$\alpha >0.2$	10	−0.333	−0.393	$\alpha >0.2$	6	0.271	0.097	$\alpha >0.2$
21853.2064	42	−0.425	−0.403	$\alpha <0.05$	42	0.544	−0.390	$\alpha <0.05$	40	−1.117	−0.751	$\alpha <0.05$
22151.7832	39	−0.059	−0.101	$\alpha >0.2$	39	0.102	−0.099	$\alpha >0.2$	37	−0.193	−0.108	$\alpha >0.2$
22517.2841	38	0.010	0.020	$\alpha >0.2$	38	0.104	0.020	$\alpha >0.2$	38	−0.654	−0.402	$\alpha <0.05$
22785.4329	6	−0.274	−0.461	$\alpha >0.2$	6	−1.071	−0.461	$\alpha >0.2$	6	1.380	0.658	$0.1< \alpha <0.2$
22951.2287	32	−0.257	−0.731	$\alpha <0.05$	32	−0.204	−0.731	$\alpha <0.05$	32	0.421	0.384	$\alpha <0.05$
23247.2818	43	−0.014	−0.033	$\alpha >0.2$	43	0.122	−0.076	$\alpha >0.2$	42	−0.059	−0.035	$\alpha >0.2$
SZ Psc												
9289.8680	13	−0.059	−0.179	$\alpha >0.2$	13	−0.093	−0.179	$\alpha >0.2$	13	−0.882	−0.632	$\alpha <0.05$
9623.3843	19	−0.237	−0.543	$\alpha <0.05$	19	−0.229	−0.543	$\alpha <0.05$	19	−0.102	−0.102	$\alpha >0.2$
9974.4286	14	−0.031	−0.081	$\alpha >0.2$	14	−0.368	−0.081	$\alpha >0.2$	14	−0.292	−0.220	$\alpha >0.2$
10278.4989	10	−0.662	−0.813	$\alpha <0.05$	10	0.116	−0.813	$\alpha <0.05$	10	−0.341	−0.473	$\alpha >0.2$
10385.8886	4	—	—	—	—	—	—	—	—	—	—	—
10753.7941	7	−0.278	−0.797	$\alpha <0.05$	7	0.138	−0.797	$\alpha <0.05$	7	0.002	0.001	$\alpha >0.2$
11061.4423	10	−0.157	−0.416	$\alpha >0.2$	10	−0.349	−0.416	$\alpha >0.2$	10	0.139	0.126	$\alpha >0.2$
11154.3118	7	−0.598	−0.541	$\alpha >0.2$	7	−0.045	−0.541	$\alpha >0.2$	7	−0.158	−0.384	$\alpha >0.2$
II Peg												
8638.0881	5	0.189	0.850	$\alpha <0.05$	—	—	—	—	—	—	—	—
8806.4334	6	0.400	0.748	$\alpha <0.05$	—	—	—	—	—	—	—	—
8889.4499	20	0.190	0.760	$\alpha <0.05$	20	0.186	0.760	$\alpha <0.05$	20	0.389	0.382	$0.1< \alpha <0.2$
8951.0620	16	0.089	0.568	$\alpha <0.05$	16	0.169	0.725	$\alpha <0.05$	13	1.003	0.577	$\alpha <0.05$
9178.4441	7	0.031	0.258	$\alpha >0.2$	7	−0.169	−0.034	$\alpha >0.2$	5	−1.000	−0.361	$\alpha >0.2$
9255.1734	31	0.112	0.591	$\alpha <0.05$	31	0.195	0.525	$\alpha <0.05$	27	0.309	0.209	$\alpha >0.2$
9329.6697	10	0.066	0.485	$\alpha >0.2$	10	0.101	0.397	$\alpha >0.2$	6	−0.166	−0.092	$\alpha >0.2$
9564.0654	15	0.130	0.926	$\alpha <0.05$	15	0.036	0.945	$\alpha <0.05$	13	0.203	0.309	$\alpha >0.2$
9633.9972	17	0.103	0.532	$0.05< \alpha <0.1$	17	0.090	0.519	$0.05< \alpha <0.1$	16	0.442	0.366	$\alpha >0.2$
9695.8458	14	0.106	0.668	$\alpha <0.05$	14	0.165	0.705	$\alpha <0.05$	13	0.701	0.441	$0.1< \alpha <0.2$

Table 5 (cont'd)

HJD_{mean}	N_V	b_{bv}	r_{bv}	α	N_{BV}	b_{ub}	r_{ub}	α	N_{UBV}	b_{ubv}	r_{ubv}	α
9895.2624	18	0.013	0.129	$\alpha >0.2$	18	0.028	0.041	$\alpha >0.2$	14	0.049	0.042	$\alpha >0.2$
9990.1386	34	0.065	0.377	$\alpha <0.05$	34	−0.074	0.312	$0.05< \alpha <0.1$	28	−0.490	−0.334	$\alpha <0.05$
10052.1587	38	−0.007	−0.043	$\alpha >0.2$	38	−0.028	−0.073	$\alpha >0.2$	24	0.083	0.042	$\alpha >0.2$
10263.5368	16	0.155	0.524	$0.05< \alpha <0.1$	16	0.122	0.501	$0.05< \alpha <0.1$	15	−0.133	−0.123	$\alpha >0.2$
10294.5293	9	0.341	0.452	$\alpha >0.2$	9	0.165	0.452	$\alpha >0.2$	9	−0.575	−0.604	$0.1< \alpha <0.2$
10307.4922	11	0.134	0.494	$0.1< \alpha <0.2$	11	0.092	0.494	$0.1< \alpha <0.2$	11	−0.517	−0.465	$\alpha >0.2$
10387.5772	20	0.148	0.571	$\alpha <0.05$	20	0.156	0.520	$\alpha <0.05$	18	0.348	0.432	$0.1< \alpha <0.2$
10416.1402	25	0.137	0.772	$\alpha <0.05$	25	0.161	0.777	$\alpha <0.05$	24	1.038	0.453	$\alpha <0.05$
10445.4181	14	0.076	0.487	$0.1< \alpha <0.2$	14	0.008	0.487	$0.1< \alpha <0.2$	11	−0.159	−0.110	$\alpha >0.2$
10469.5866	10	0.143	0.881	$\alpha <0.05$	10	0.225	0.850	$\alpha <0.05$	8	1.021	0.595	$0.1< \alpha <0.2$
10615.9155	32	0.141	0.800	$\alpha <0.05$	32	0.241	0.806	$\alpha <0.05$	29	1.163	0.572	$\alpha <0.05$
10673.9922	37	0.063	0.335	$\alpha <0.05$	37	0.248	0.335	$\alpha <0.05$	37	0.726	0.225	$0.1< \alpha <0.2$
10726.1096	26	0.172	0.741	$\alpha <0.05$	26	0.126	0.741	$\alpha <0.05$	26	0.310	0.444	$\alpha <0.05$
10772.8949	37	0.157	0.702	$\alpha <0.05$	37	0.108	0.702	$\alpha <0.05$	37	0.359	0.377	$\alpha <0.05$
10828.5922	8	0.194	0.369	$\alpha >0.2$	8	0.175	0.369	$\alpha >0.2$	8	0.194	0.517	$\alpha >0.2$
10981.9313	22	0.223	0.619	$\alpha <0.05$	22	0.080	0.619	$\alpha <0.05$	22	0.219	0.441	$0.05< \alpha <0.1$
11103.1401	48	0.100	0.554	$\alpha <0.05$	48	0.133	0.618	$\alpha <0.05$	42	0.787	0.435	$\alpha <0.05$
11165.1479	50	0.104	0.747	$\alpha <0.05$	50	0.137	0.757	$\alpha <0.05$	47	0.875	0.526	$\alpha <0.05$
11358.7956	20	−0.035	−0.157	$\alpha >0.2$	20	0.055	−0.098	$\alpha >0.2$	15	−0.544	−0.364	$0.1< \alpha <0.2$
11462.3067	43	0.085	0.803	$\alpha <0.05$	43	0.097	0.810	$\alpha <0.05$	40	0.816	0.521	$\alpha <0.05$
11533.6648	53	0.083	0.734	$\alpha <0.05$	53	0.103	0.821	$\alpha <0.05$	47	0.939	0.545	$\alpha <0.05$
11710.4644	14	0.125	0.878	$\alpha <0.05$	14	0.095	0.856	$\alpha <0.05$	11	0.296	0.344	$\alpha >0.2$
11767.5864	19	0.089	0.597	$\alpha <0.05$	19	0.258	0.465	$0.05< \alpha <0.1$	17	0.118	0.041	$\alpha >0.2$
11869.5459	79	0.083	0.861	$\alpha <0.05$	79	0.118	0.862	$\alpha <0.05$	67	1.083	0.640	$\alpha <0.05$
12067.4590	11	−0.025	−0.201	$\alpha >0.2$	11	0.211	−0.254	$\alpha >0.2$	8	−0.598	−0.236	$\alpha >0.2$
12191.6234	48	0.106	0.573	$\alpha <0.05$	48	0.237	0.526	$\alpha <0.05$	43	1.117	0.454	$\alpha <0.05$
12264.6804	37	0.174	0.634	$\alpha <0.05$	37	0.212	0.631	$\alpha <0.05$	33	0.900	0.553	$\alpha <0.05$
12474.7677	23	0.108	0.526	$\alpha <0.05$	23	0.112	0.424	$0.05< \alpha <0.1$	18	1.304	0.496	$\alpha <0.05$
12604.7252	76	0.085	0.664	$\alpha <0.05$	76	0.060	0.654	$\alpha <0.05$	71	0.575	0.281	$\alpha <0.05$
12805.4272	16	0.080	0.521	$0.05< \alpha <0.1$	16	0.080	0.573	$\alpha <0.05$	13	0.225	0.178	$\alpha >0.2$
12873.8960	29	0.069	0.559	$\alpha <0.05$	29	0.116	0.563	$\alpha <0.05$	28	1.037	0.443	$\alpha <0.05$
12951.7466	39	0.022	0.137	$\alpha >0.2$	39	0.121	0.199	$0.1< \alpha <0.2$	35	0.437	0.243	$0.05< \alpha <0.1$
13006.1216	21	0.092	0.338	$\alpha >0.2$	21	−0.037	0.407	$0.1< \alpha <0.2$	19	1.941	0.472	$0.05< \alpha <0.1$
13170.9253	16	0.109	0.370	$\alpha >0.2$	16	0.190	0.497	$0.1< \alpha <0.2$	13	0.494	0.180	$\alpha >0.2$
13296.7766	53	0.155	0.727	$\alpha <0.05$	53	0.252	0.782	$\alpha <0.05$	44	1.156	0.645	$\alpha <0.05$
						BY Dra						
8025.9610	13	0.193	0.433	$\alpha <0.05$	—	—	—	—	—	—	—	—
8180.1438	10	0.420	0.761	$\alpha <0.05$	—	—	—	—	—	—	—	—
8206.5741	6	0.148	0.193	$\alpha <0.05$	—	—	—	—	—	—	—	—
8366.4784	11	0.103	0.198	$\alpha <0.05$	—	—	—	—	—	—	—	—
8394.9265	12	−0.132	−0.294	$\alpha >0.2$	12	−0.563	0.412	$\alpha >0.2$	5	0.614	0.222	$\alpha >0.2$
8550.1205	17	0.258	0.437	$\alpha >0.2$	—	—	—	—	—	—	—	—
8737.9716	20	0.103	0.448	$0.05< \alpha <0.1$	20	0.412	0.922	$\alpha <0.05$	9	0.758	0.196	$\alpha >0.2$
8779.4470	12	0.168	0.503	$0.1< \alpha <0.2$	12	−0.252	0.462	$\alpha >0.2$	7	0.601	0.337	$\alpha >0.2$
8803.3583	13	0.001	0.003	$\alpha >0.2$	—	—	—	—	—	—	—	—
8881.9215	18	0.473	0.558	$\alpha <0.05$	18	0.366	0.558	$\alpha <0.05$	18	0.086	0.062	$\alpha >0.2$
8927.9618	17	−0.042	−0.095	$\alpha >0.2$	17	−0.239	0.038	$\alpha >0.2$	9	−0.188	−0.083	$\alpha >0.2$
9101.4235	8	0.168	0.508	$0.05< \alpha <0.1$	—	—	—	—	—	—	—	—
9124.4417	14	−0.015	−0.091	$\alpha >0.2$	14	0.147	0.363	$\alpha >0.2$	6	0.414	0.131	$\alpha >0.2$
9176.2046	23	0.211	0.241	$\alpha >0.2$	23	−0.072	0.293	$\alpha >0.2$	10	−1.332	−0.681	$\alpha <0.05$
9252.6689	14	0.173	0.164	$\alpha >0.2$	14	0.708	0.338	$\alpha >0.2$	10	1.324	0.727	$\alpha <0.05$
9480.9194	9	−0.231	−0.368	$\alpha >0.2$	—	—	—	—	—	—	—	—
9524.8022	13	0.038	0.033	$\alpha >0.2$	13	0.531	−0.041	$\alpha >0.2$	7	−1.035	−0.552	$0.05< \alpha <0.1$
9887.9485	16	0.156	0.224	$\alpha >0.2$	16	0.289	0.182	$\alpha >0.2$	11	−0.523	−0.239	$\alpha >0.2$
9904.9287	15	−0.062	−0.070	$\alpha >0.2$	15	−0.974	0.010	$\alpha >0.2$	9	1.631	0.497	$0.1< \alpha <0.2$
9994.1446	16	0.177	0.259	$\alpha >0.2$	16	0.811	0.215	$\alpha >0.2$	12	−0.467	−0.180	$\alpha >0.2$
10020.1085	11	0.032	0.063	$\alpha >0.2$	11	−0.700	0.455	$\alpha >0.2$	6	−1.465	−0.609	$0.05< \alpha <0.1$
10217.4536	20	−0.155	−0.201	$\alpha >0.2$	—	—	—	—	—	—	—	—
10500.0084	20	0.096	0.139	$\alpha >0.2$	20	−0.965	0.179	$\alpha >0.2$	15	−0.481	−0.181	$\alpha >0.2$

Table 5 (cont'd)

HJD_{mean}	N_V	b_{bv}	r_{bv}	α	N_{BV}	b_{ub}	r_{ub}	α	N_{UBV}	b_{ubv}	r_{ubv}	α
10526.4607	16	−0.042	−0.072	$\alpha >0.2$	16	0.218	−0.348	$\alpha >0.2$	10	−0.093	−0.044	$\alpha >0.2$
10546.9036	24	0.122	0.337	$0.1< \alpha <0.2$	24	0.380	0.229	$\alpha >0.2$	17	−0.075	−0.024	$\alpha >0.2$
10663.0347	17	−0.144	−0.117	$\alpha >0.2$	17	−0.699	−0.117	$\alpha >0.2$	17	0.271	0.092	$\alpha >0.2$
10893.9312	5	−0.009	−0.071	$\alpha >0.2$	—	—	—	—	—	—	—	—
11025.4648	11	−0.029	−0.149	$\alpha >0.2$	11	−0.343	−0.149	$\alpha >0.2$	11	0.868	0.208	$\alpha >0.2$
11067.3032	11	0.097	0.174	$\alpha >0.2$	11	−0.279	0.174	$\alpha >0.2$	11	0.275	0.167	$\alpha >0.2$
11324.4531	13	0.089	0.061	$\alpha >0.2$	13	1.327	0.061	$\alpha >0.2$	13	−1.435	−0.505	$0.1< \alpha <0.2$
11645.8722	9	−0.078	−0.081	$\alpha >0.2$	9	0.393	−0.719	$\alpha <0.05$	5	−0.485	−0.271	$\alpha >0.2$
11743.5259	10	−0.062	−0.072	$\alpha >0.2$	10	−1.857	−0.072	$\alpha >0.2$	10	2.257	0.528	$0.1< \alpha <0.2$
11803.3443	15	−0.022	−0.033	$\alpha >0.2$	15	0.593	−0.033	$\alpha >0.2$	15	0.622	0.204	$\alpha >0.2$
12070.3561	26	0.370	0.346	$0.1< \alpha <0.2$	26	−0.099	0.772	$\alpha <0.05$	13	−0.672	−0.244	$\alpha >0.2$
12199.0969	30	0.032	0.075	$\alpha >0.2$	30	−0.277	−0.187	$\alpha >0.2$	14	0.269	0.112	$\alpha >0.2$
12417.2990	11	0.065	0.345	$\alpha >0.2$	11	0.019	0.944	$\alpha <0.05$	5	−0.104	−0.048	$\alpha >0.2$
12465.9995	18	0.206	0.553	$\alpha <0.05$	18	−0.055	0.553	$\alpha <0.05$	18	−0.255	−0.224	$\alpha >0.2$
12558.4988	23	0.108	0.237	$\alpha >0.2$	23	−0.096	0.244	$\alpha >0.2$	16	−1.179	−0.451	$0.05< \alpha <0.1$
12724.9823	23	−0.040	−0.084	$\alpha >0.2$	23	0.712	−0.140	$\alpha >0.2$	14	0.351	0.169	$\alpha >0.2$
12794.7732	44	0.198	0.348	$\alpha <0.05$	44	−0.120	0.380	$\alpha <0.05$	23	−0.282	−0.146	$0.1< \alpha <0.2$
12927.6114	28	0.152	0.513	$\alpha <0.05$	28	0.010	0.571	$\alpha <0.05$	16	−0.317	−0.137	$\alpha >0.2$
13166.8457	17	−0.038	−0.048	$\alpha >0.2$	17	0.479	0.372	$\alpha >0.2$	8	−0.099	−0.041	$\alpha >0.2$
13288.6200	19	−0.376	−0.238	$\alpha >0.2$	19	1.097	−0.311	$\alpha >0.2$	10	−0.859	−0.236	$\alpha >0.2$

Table 6 Average slopes and related uncertainty of the linear fits to: B−V vs. V, U−B vs. V and U−B vs. B−V relations. Only light curves (N) whose magnitude and colors were correlated with a high significance level ($\alpha < 0.1$) are considered. The slopes' smallest and largest values are also listed.

Short−term rotational modulation

Target		N	Average Slope	Min	Max
AR Psc	<BV/V>	4	-0.39± 0.15	-0.60	-0.23
	<UB/V>	4	-0.12± 0.41	-0.40	0.47
	<UB/BV>	7	-0.70± 0.31	-1.16	-0.15
VY Ari	<BV/V>	24	0.18± 0.07	0.09	0.35
	<UB/V>	24	0.23± 0.17	-0.22	0.69
	<UB/BV>	14	0.96± 0.37	0.42	1.74
UX Ari	<BV/V>	30	-0.19± 0.08	-0.45	-0.09
	<UB/V>	30	-0.29± 0.08	-0.61	-0.14
	<UB/BV>	23	1.07± 0.52	-0.63	1.74
V711 Tau	<BV/V>	8	-0.04± 0.13	-0.16	0.21
	<UB/V>	10	-0.16± 0.13	-0.46	0.04
	<UB/BV>	7	-0.41± 0.68	-1.69	0.63
EI Eri	<BV/V>	17	0.12± 0.22	-0.37	0.36
	<UB/V>	17	0.15± 0.22	-0.17	0.88
	<UB/BV>	8	0.09± 0.95	-0.93	1.48
V1149 Ori	<BV/V>	27	0.13± 0.04	0.05	0.21
	<UB/V>	27	0.15± 0.09	-0.10	0.38
	<UB/BV>	13	0.57± 0.44	-0.34	1.50
DH Leo	<BV/V>	3	-0.18± 1.03	-1.36	0.56
	<UB/V>	3	0.14± 0.33	-0.24	0.39
	<UB/BV>	2	0.36± 1.11	-0.42	1.15
HU Vir	<BV/V>	38	0.11± 0.03	0.07	0.17
	<UB/V>	38	0.15± 0.14	-0.09	0.60
	<UB/BV>	27	0.60± 0.55	-1.08	1.82
RS CVn	<BV/V>	18	-0.23± 0.06	-0.41	-0.14
	<UB/V>	18	-0.18± 0.09	-0.38	0.02
	<UB/BV>	7	0.34± 0.24	-0.18	0.60
V775 Her	<BV/V>	20	0.18± 0.14	-0.23	0.37
	<UB/V>	21	0.16± 0.28	-0.58	0.55
	<UB/BV>	10	-0.08± 1.35	-2.00	1.63
AR Lac	<BV/V>	8	-0.37± 0.16	-0.58	-0.13
	<UB/V>	10	-0.01± 0.26	-0.33	0.54
	<UB/BV>	12	-0.38± 0.83	-2.25	0.74
II Peg	<BV/V>	32	0.13± 0.06	0.06	0.40
	<UB/V>	30	0.14± 0.06	-0.07	0.25
	<UB/BV>	20	0.82± 0.51	-0.49	1.94
BY Dra	<BV/V>	10	0.21± 0.13	0.10	0.47
	<UB/V>	8	0.11± 0.23	-0.12	0.41
	<UB/BV>	5	-0.73± 1.16	-1.46	1.32
SZ Psc	<BV/V>	3	-0.39± 0.23	-0.66	-0.24
	<UB/V>	3	-0.00± 0.24	-0.23	0.12
	<UB/BV>	1	-0.88± —-	—	—

Table 7. Slopes and related uncertainty of the linear fits to: B−V vs. V, U−B vs. V and U−B vs. B−V relations on the long-term time scale, to the light curve brightest magnitude vs. bluest colors ($_{\rm min}$) and faintest magnitude vs. reddest colors ($_{\rm max}$). Number N of observations, correlation coefficient (r) and related significance level are also listed.

Long−term variation

	N	Slope	r	Significance
AR Psc				
B−V/V	595	−0.08± 0.01	−0.27	$\alpha < 0.01$
$(\mathrm{B-V/V})_{\rm min}$	34	−0.08± 0.05	−0.28	$0.05 < \alpha < 0.1$
$(\mathrm{B-V/V})_{\rm max}$	34	−0.10± 0.05	−0.34	$\alpha < 0.01$
U−B/V	558	−0.11± 0.01	−0.37	$\alpha < 0.01$
$(\mathrm{U-B/V})_{\rm min}$	33	−0.10± 0.04	−0.38	$\alpha < 0.01$
$(\mathrm{U-B/V})_{\rm max}$	33	−0.13± 0.04	−0.56	$\alpha < 0.01$
U−B/B−V	558	−0.00± 0.04	−0.00	$\alpha < 0.01$
VY Ari				
B−V/V	963	0.11± 0.01	0.54	$\alpha < 0.01$
$(\mathrm{B-V/V})_{\rm min}$	39	0.03± 0.05	0.12	$0.05 < \alpha < 0.2$
$(\mathrm{B-V/V})_{\rm max}$	39	0.07± 0.02	0.41	$\alpha < 0.01$
U−B/V	907	0.12± 0.01	0.27	$0.05 < \alpha < 0.1$
$(\mathrm{U-B/V})_{\rm min}$	38	−0.28± 0.15	−0.31	$\alpha < 0.01$
$(\mathrm{U-B/V})_{\rm max}$	38	0.07± 0.07	0.18	$0.2 < \alpha < 0.1$
U−B/B−V	907	0.74± 0.07	0.34	$\alpha < 0.01$
UX Ari				
B−V/V	1155	−0.16± 0.00	−0.82	$\alpha < 0.01$
$(\mathrm{B-V/V})_{\rm min}$	37	−0.10± 0.03	−0.45	$\alpha < 0.01$
$(\mathrm{B-V/V})_{\rm max}$	37	−0.07± 0.02	−0.52	$\alpha < 0.01$
U−B/V	1089	−0.29± 0.01	−0.84	$\alpha < 0.01$
$(\mathrm{U-B/V})_{\rm min}$	36	−0.19± 0.06	−0.52	$\alpha < 0.01$
$(\mathrm{U-B/V})_{\rm max}$	36	−0.13± 0.05	−0.39	$\alpha < 0.01$
U−B/B−V	1089	1.20± 0.04	0.68	$\alpha < 0.01$
V711 Tau				
B−V/V	732	−0.01± 0.01	−0.07	$\alpha < 0.01$
$(\mathrm{B-V/V})_{\rm min}$	31	−0.03± 0.03	−0.20	$0.05 < \alpha < 0.2$
$(\mathrm{B-V/V})_{\rm max}$	31	0.01± 0.04	0.04	$0.05 < \alpha < 0.2$
U−B/V	670	−0.04± 0.01	−0.12	$0.05 < \alpha < 0.2$
$(\mathrm{U-B/V})_{\rm min}$	29	−0.02± 0.06	−0.08	$0.05 < \alpha < 0.2$
$(\mathrm{U-B/V})_{\rm max}$	29	0.02± 0.07	0.06	$0.05 < \alpha < 0.2$
U−B/B−V	670	0.48± 0.06	0.29	$\alpha < 0.01$
EI Eri				
B−V/V	931	0.16± 0.01	0.40	$\alpha < 0.01$
$(\mathrm{B-V/V})_{\rm min}$	43	0.20± 0.05	0.53	$\alpha < 0.01$
$(\mathrm{B-V/V})_{\rm max}$	43	0.19± 0.05	0.53	$\alpha < 0.01$
U−B/V	828	0.20± 0.02	0.27	$\alpha < 0.01$
$(\mathrm{U-B/V})_{\rm min}$	42	0.34± 0.10	0.49	$\alpha < 0.01$
$(\mathrm{U-B/V})_{\rm max}$	42	0.17± 0.10	0.25	$\alpha < 0.01$
U−B/B−V	828	0.42± 0.06	0.24	$\alpha < 0.01$
V1149 Ori				
B−V/V	1225	0.12± 0.00	0.70	$\alpha < 0.01$
$(\mathrm{B-V/V})_{\rm min}$	35	0.13± 0.02	0.71	$\alpha < 0.01$
$(\mathrm{B-V/V})_{\rm max}$	35	0.15± 0.03	0.68	$\alpha < 0.01$
U−B/V	1115	0.00± 0.01	0.00	$\alpha < 0.01$
$(\mathrm{U-B/V})_{\rm min}$	35	−0.03± 0.04	−0.11	$0.05 < \alpha < 0.2$
$(\mathrm{U-B/V})_{\rm max}$	35	0.00± 0.06	0.00	$0.05 < \alpha < 0.2$
U−B/B−V	1115	0.07± 0.04	0.05	$\alpha < 0.01$
DH Leo				
B−V/V	184	0.03± 0.04	0.06	$\alpha < 0.01$
$(\mathrm{B-V/V})_{\rm min}$	13	−0.06± 0.15	−0.11	$\alpha < 0.01$
$(\mathrm{B-V/V})_{\rm max}$	13	0.14± 0.11	0.36	$0.05 < \alpha < 0.2$
U−B/V	179	0.18± 0.06	0.22	$0.05 < \alpha < 0.2$
$(\mathrm{U-B/V})_{\rm min}$	12	0.35± 0.42	0.26	$0.05 < \alpha < 0.2$
$(\mathrm{U-B/V})_{\rm max}$	12	0.09± 0.20	0.14	$0.05 < \alpha < 0.2$
U−B/B−V	179	−0.17± 0.12	−0.11	$\alpha < 0.01$

Table 7. Continued.

	N	Slope	r	Significance
HU Vir				
B−V/V	2247	0.11± 0.00	0.56	$\alpha < 0.01$
$(B-V/V)_{min}$	52	0.12± 0.02	0.69	$\alpha < 0.01$
$(B-V/V)_{max}$	52	0.12± 0.01	0.81	$\alpha < 0.01$
U−B/V	1127	0.16± 0.01	0.44	$\alpha < 0.01$
$(U-B/V)_{min}$	50	0.19± 0.04	0.54	$\alpha < 0.01$
$(U-B/V)_{max}$	50	0.13± 0.03	0.52	$\alpha < 0.01$
U−B/B−V	1127	0.72± 0.05	0.38	$\alpha < 0.01$
RS CVn				
BV/V	1311	-0.20± 0.01	-0.66	$\alpha < 0.01$
$(BV/V)_{min}$	19	-0.00± 0.02	-0.03	$\alpha < 0.01$
$(BV/V)_{max}$	19	0.05± 0.08	0.14	$\alpha < 0.01$
UB/V	1222	-0.00± 0.00	-0.01	$\alpha < 0.01$
$(UB/V)_{min}$	19	0.02± 0.04	0.13	$\alpha < 0.01$
$(UB/V)_{max}$	19	-0.12± 0.13	-0.21	$0.05 < \alpha < 0.2$
UB/BV	1222	0.03± 0.19	0.00	$\alpha < 0.01$
V775 Her				
B−V/V	1042	0.14± 0.01	0.54	$\alpha < 0.01$
$(B-V/V)_{min}$	54	0.14± 0.02	0.78	$\alpha < 0.01$
$(B-V/V)_{max}$	54	0.15± 0.02	0.71	$\alpha < 0.01$
U−B/V	569	0.29± 0.02	0.48	$\alpha < 0.01$
$(U-B/V)_{min}$	45	0.33± 0.05	0.71	$\alpha < 0.01$
$(U-B/V)_{max}$	45	0.30± 0.06	0.59	$\alpha < 0.01$
U−B/B−V	569	0.63± 0.09	0.28	$\alpha < 0.01$
AR Lac				
BV/V	735	-0.14± 0.02	-0.25	$\alpha < 0.01$
$(BV/V)_{min}$	22	0.06± 0.10	0.13	$\alpha < 0.01$
$(BV/V)_{max}$	22	0.03± 0.05	0.14	$\alpha < 0.01$
UB/V	614	0.00± 0.01	0.03	$\alpha < 0.01$
$(UB/V)_{min}$	18	-0.02± 0.16	-0.03	$\alpha < 0.01$
$(UB/V)_{max}$	414	0.13± 0.02	0.25	$\alpha < 0.01$
UB/BV	614	0.27± 0.12	0.10	$\alpha < 0.01$
II Peg				
B−V/V	1191	0.09± 0.00	0.51	$\alpha < 0.01$
$(B-V/V)_{min}$	45	0.10± 0.04	0.33	$\alpha < 0.01$
$(B-V/V)_{max}$	45	0.06± 0.02	0.39	$\alpha < 0.01$
U−B/V	1046	0.12± 0.01	0.43	$\alpha < 0.01$
$(U-B/V)_{min}$	43	0.14± 0.05	0.39	$\alpha < 0.01$
$(U-B/V)_{max}$	43	0.09± 0.03	0.46	$\alpha < 0.01$
U−B/B−V	1046	0.28± 0.05	0.18	$\alpha < 0.01$
BY Dra				
B−V/V	693	0.06± 0.01	0.27	$\alpha < 0.01$
$(B-V/V)_{min}$	43	0.04± 0.02	0.28	$\alpha < 0.01$
$(B-V/V)_{max}$	43	0.06± 0.02	0.45	$\alpha < 0.01$
U−B/V	399	0.01± 0.03	0.03	$\alpha < 0.01$
$(U-B/V)_{min}$	33	0.04± 0.07	0.12	$0.05 < \alpha < 0.2$
$(U-B/V)_{max}$	33	−0.01± 0.06	−0.02	$0.05 < \alpha < 0.2$
U−B/B−V	399	−0.58± 0.12	−0.24	$\alpha < 0.01$
SZ Psc				
B−V/V	86	−0.18± 0.05	−0.35	$\alpha < 0.01$
$(B-V/V)_{min}$	7	−0.20± 0.33	−0.26	$\alpha < 0.01$
$(B-V/V)_{max}$	7	−0.12± 0.24	−0.22	$\alpha < 0.01$
U−B/V	86	−0.18± 0.05	−0.40	$0.05 < \alpha < 0.2$
$(U-B/V)_{min}$	7	0.37± 0.20	0.62	$0.05 < \alpha < 0.1$
$(U-B/V)_{max}$	7	−0.05± 0.16	−0.13	$0.05 < \alpha < 0.1$
U−B/B−V	86	−0.70± 0.30	−0.25	$0.05 < \alpha < 0.1$